TYPES RA6217A, RA6217A-3 AND RA6217E

HIGH-FREQUENCY COMMUNICATION RECEIVERS

RACAL
COMMUNICATIONS, INC.

5 RESEARCH PLACE, ROCKVILLE, MARYLAND 20850 • TELEPHONE: (301) 948-4420 • TELEX 89-8456

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HIGH-FREQUENCY COMMUNICATION RECEIVERS

TECHNICAL MANUAL

RACAL COMMUNICATIONS, INCORPORATED
5 RESEARCH PLACE
ROCKVILLE, MARYLAND
U.S.A.

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(RCI No. 84208)

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RA6217E ADDENDUM

The RA6217E is identical to the RA6217A except for two modifications:

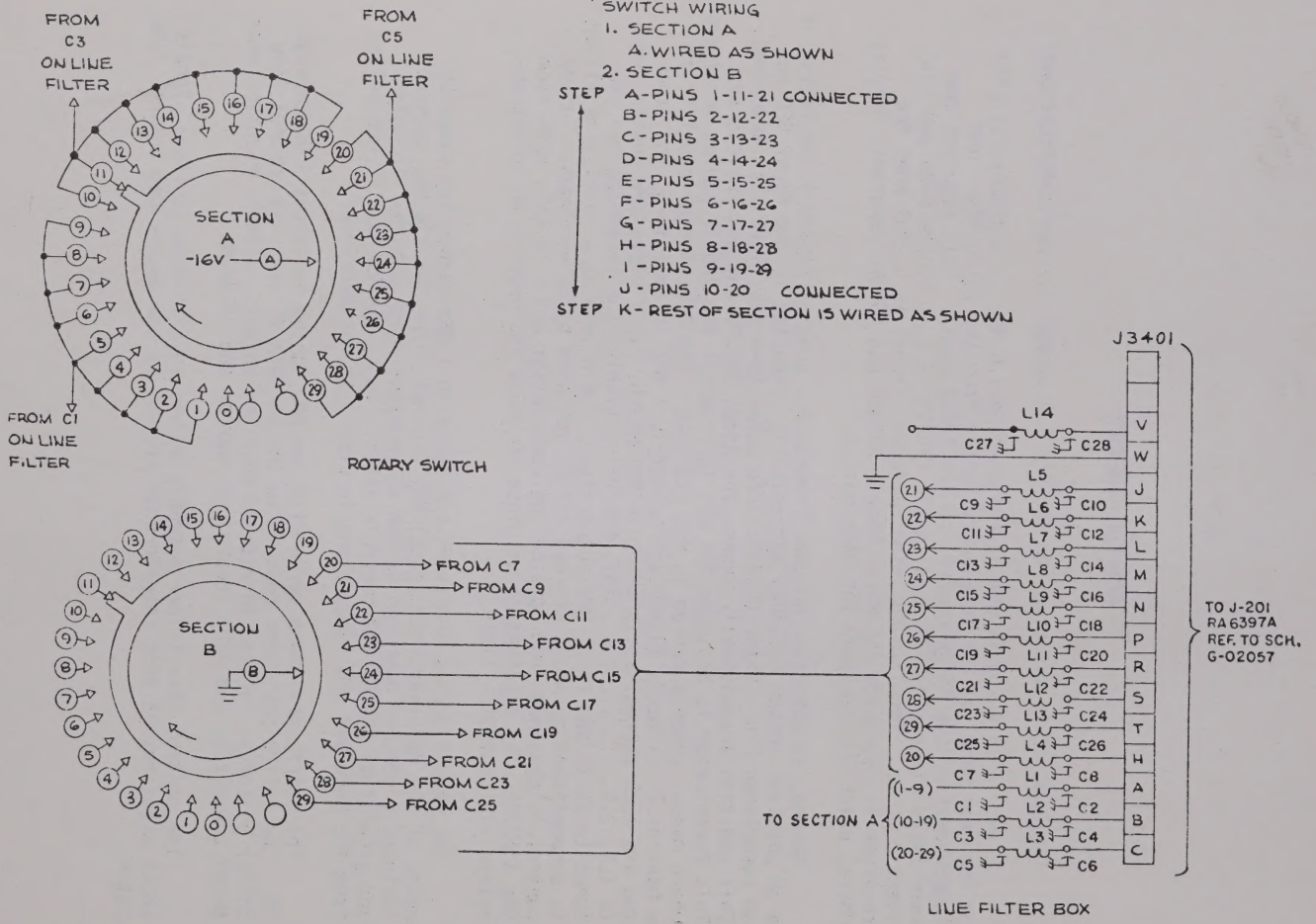
First, a 75 kHz wide output centered on 1.6 MHz is available at J113 on the rear panel of the receiver directly from the Third Mixer and independent of the IF BW control on the front panel. This requires the same Third Mixer (A02290) used in the RA6217A-3 (see figure 6-26 and 7-10 sheet 2 of 2). This 1.6 MHz side bandwidth signal is useful when the receiver is used with the Racal Models RA6366 and RA6367 Panoramic Display Units, which are designed for this output.

Second, an automatic Antenna Preselector Control (A03402) consisting of a 30 position switch (B03306) mechanically connected to the First VFO and an associated Line Filter (A03318) are added (see fig. 1 of this addendum). This addition automotically tunes, the Racal RA6397 Antenna Preselector. This Preselector is designed for use in front of the RA6217 series Receivers where manual antenna tuning is not utilized. The Preselector consists of a bank of 21 filters, 19 are approximately 1 MHz in bandwidth; the other two are each approximately 5 MHz in bandwidth. 19 filters are center tuned to 1.5, 2.5, ...19.5 MHz respectively; the remaining two are tuned to 20-25 and 25-30 MHz respectively. Selection of a particular filter is accomplished by means of reed relays actuated by DC voltages. Tuning control is obtained from outside the Preselector box - in this case from the RA6217E - by application of minus 16 volts and grounds to selection-relays via control - lines.

The RA6217 series Receivers are tuned in 1 MHz bandtuning steps by means of the Receiver front panel MHz control. The RA6217E MHz control includes a special gear and switch arrangement which applies -16 volts and grounds to the RA6397 controls lines. Thus, the RA6397A is controlled from the Receiver and tunes along in step with the Receiver.

The thirty positions agree with the MHz tuning positions - 00 through 29. The switch positions connect to the RA6397A filters via control line filter assembly, located in rear of Receiver chassis: J3401, Receiver rear panel connector; and J201 located on rear of the RA6397A.

The control line filter assembly serves to eliminate spurious signals which might result from interference pick-up by the unshielded control line cable.



DRAWING NAME	30 POSITIONS ROTARY SWITCH SCHEMATIC	
DWG SIZE C	DRAWING NUMBER 03340	REV C

Fig. & Index No.	Part No. Mfg.	Part No. RCI	Description	Units Per Assy	Reference Designation
(6217A/A3) (Fig. 6-1)	Used RA6217E (only)	A03402	ANTENNA FILTER CONTROL		
Index 15			SWITCH ASSEMBLY		
		B03306	SWITCH ROTARY 2 POLE 30 POSITION	1	S1
		B03298	BRACKET, SWITCH MOUNTING	1	
		A03992	GEAR		
Index 6		A03218-2	LINE FILTER ASSEMBLY	1	
	SS5A	26404	CAPACITOR, 100 pf (Allen Bradley)	28	C1 thru C28
		A02900-2	CONNECTOR, 20 CONTACT FEMALE (AMP)	1	J3401
	9220-20	43011	CHOKE 680 MILLIHENRY	14	L1 thru L14

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Frontispiece - Type RA6217A High-Frequency Communications Receiver (Front View)

Frontispiece - Type RA6217A-3 High-Frequency Communications Receiver (Front View)

CHAPTER 1 - DESCRIPTION

1.1 GENERAL

The communications receiver Type RA6217A has been designed for use as a general purpose receiver to provide a high order of selectivity and stability. The receiver covers a frequency range from 980 kHz to 30 MHz with continuous tuning via electronic bandswitching. The internal crystal controlled oscillator provides calibration markers at each 100-kHz interval to facilitate checking of the 2nd VFO and digital readout frequencies.

The RA6217A-3 is identical to the RA6217A except for the following additional features:

(1) Additional circuitry has been added to the CALIBRATE/FINE TUNE control in the form of a resistive network to decrease the range of the control.

(2) Coarse control is provided by means of a screwdriver adjustment available on the front panel.

(3) The IF output frequency is changed from 455 kHz to 100 kHz. The change in IF output frequency is accomplished by substituting a 100 kHz Converter printed circuit assembly in place of the standard 455 kHz assembly.

The receiver is designed to operate -- at the customer's option -- from any one of the following power sources:

(1) Standard AC sources, 100-125 or 200-250 volts, 48-420 cps. - MA6302

(2) Nickel cadmium battery pack. - MA6704

(3) A DC to DC converter which can be switched for either a 12 or 24 volt DC system with either line grounded. - MA6301

(4) Standard AC source with nickel cadmium battery charging facilities. - MA6300

1.2 CONSTRUCTION DETAILS

The RA6217A features continuous tuning via electronic bandswitching which eliminates switches, complex wiring and involved mechanical tracking mechanisms. The complete absence of switch contacts in frequency determining circuits contributes to the stability, reliability and speed of operation while sensitivity and setting accuracy are essentially constant over the entire tuning range.

TECHNICAL SPECIFICATIONS

Frequency Range:	980 kHz to 30 MHz, can be extended down to 3 kHz with LF Converter, RA6337.
Reception Modes:	AM, FM, MCW, CW, SSB
Tuning:	Digital readout in MHz and kHz with interpolation at 200-Hz intervals
Frequency Setting Accuracy:	Within 250 Hz, with an oscillator output for a digital counter available.
Antenna Input:	75 ohms wideband or double tuned in 5 bands, with VSWR 2:1 or better
Sensitivity (3-kHz bandwidth):	CW, SSB, 0.5 u/volt for 15 dB S/N ratio MCW, AM (30% mod) 1.5 u/volt for 15 dB S/N ratio
Sensitivity (13 kHz bandwidth):	FM (±6 kHz deviation) 1 u/volt for 10 milliwatt AF output
Stability (typical):	a. Long Term: 50 Hz per 8 hour period at ambient temperature b. Short Term: 5 Hz at ambient temperature c. Variation with Temperature: Less than 50 Hz per °C
Stability (Ext. Control):	Facilities are provided to enable injection of external synthesizer or external standard oscillators also master/slave operation in diversity systems. Stability determined by System Standard Employed.
Calibration:	Internal calibration oscillator provides markers at 100-kHz intervals.
Selectivity:	13, 6.0, 3.0, 1.0 kHz and 200 Hz, 3-dB points.
Shape Factor (6 - 60 dB):	1:4 or better, 1:10 or better for 200 Hz bandwidth
IF Outputs:	a. 2-3 MHz output. b. 1.6 MHz - 100 mv nom. to 75 ohms after IF selectivity.

TECHNICAL SPECIFICATIONS (Cont'd)

IF Outputs (Cont'd):	c. 455 kHz - 200 mv nom. to 50 ohm is standard. (100 kHz - 100 mv nom. to 50 ohm for RA6217A-3)
Noise Figure:	Less than 11 dB throughout
AGC:	a. Input variation of 80 dB causes no more than 3 dB change in output level. b. Time constants (nominal): Short charge, 16 milliseconds, discharge 30 milliseconds Medium charge, 50 milliseconds, discharge 200 milliseconds Long charge, 80 milliseconds, discharge 4 seconds
BFO Range:	±8 kHz, (variable) with fixed crystal control points at ±1.5 kHz, coarse and fine control facilities
Meter Indication:	a. "S" scale (dB ref 1 microvolt) b. AF level to line - RA6217A/A3
AF Output:	a. 10 milliwatts to headphone jack and rear terminals, 600 ohms b. Independent 1.0 milliwatt output to rear terminal, 600 ohms
AF Response (overall):	To correspond with IF bandwidth in use and maintained to within 3 dB at 100 Hz. Optional bass cut at 300 Hz.
AF Distortion (overall):	Less than 2%
RF Input Attenuator:	0 to 40 dB nominal in 10 dB steps - RA6217A/A3
Spurious Response to External Signal:	Better than 60 dB down for signals less than 10% off tune -- better than 80 dB for signals more than 10% off tune
Internally Generated Spurious Signals:	Below noise when measured with a 3 kHz bandwidth except at 1.0 MHz where response can be 5 dB above receiver noise.

TECHNICAL SPECIFICATIONS (Cont'd)

Image Rejection:	80 dB or better
Inband Intermodulation Distortion Products:	40 dB below two desired 3 mV input signals within the receiver passband
Out of Band Intermodulation Distortion Products (Second Order) with Tuned Input:	-90 dB or better
Cross Modulation:	For levels of wanted signal between 5 microvolts and 1.0 millivolt, an interferring signal 1.33% removed and modulated 30% must have a level at least 46 dB greater than the wanted signal to produce a cross modulation of 3%. The ratio is improved up to 10% off tune at the rate of approximately 2 dB per %.
Oscillator Radiation at Antenna Terminal:	Less than 5 uv across 75 ohms
Linearity:	Output linear within 6% over a 40 dB dynamic range for inputs from 0.25 microvolts to 30.0 millivolts
Controls:	MHz tuning, kHz tuning, RF range, RF tuning, RF attenuator, RF/IF gain, Function switch, AF gain. BFO switch, BFO tune, IF bandwidth. Calibrate/fine tune, Tuning lock. Dimmer (pre-set), Meter switch. AF Line Level (Pre-set), VFO INT/EXT Switch.
Power Supplies: (Optional Plug-in Units)	a. MA6302 - AC Power Unit. Line 100 - 125 and 200 - 250 volts. 48-420 Hz, 10 V/A approximately. b. MA6304 - AC Power Unit. Succeeds MA6302 c. MA6704 - Dry Battery Pack capable of supplying equipment requirements for a period of eight (8) hours. (not plug-in). d. MA6301 - DC Converter for operation from 11 - 30 volts (DC with either line at ground. e. MA6300 - AC Power Unit/Battery Charger with trickle charging facilities for b.

Environmental Conditions:	Operating +55°C (131°F) to 0°C (32°F) Storage +70°C (158°F) to 40°C (104°F)
Dimensions:	17" x 3-12/" x 17" with 19" rack mount front panel.
Weight:	Approximately 25 pounds depending on power supply.
Rear Panel Connections:	a. Power cord, integral with plug-in AC power supply, 8 foot cord, three wire grounding plug. b. RF Input (J201) (Antenna input), UG-1094/U mates with UG-88B/U. c. TB101: -16V UNREG, -16V SW, -16V REG, AGC BUSS, 600 ohm 10 mW, 600 ohm 1 mW. d. J102 (1 MHz OUT), J103 (1 MHz IN), J104 (2-3 MHz OUT), J105 (2-3 MHz IN) J106 (VFO 2 IN), J107 (VFO 2 OUT), J113 (1.6 MHz WIDE OUT). e. J3002 (455 kHz OUT)*, J3002 (100 kHz OUT)**, J3003 (1.145 MHz IN/OUT)*, J3003 (1.5/1.7 MHz)**, J3004 (1.6 MHz OUT) f. TB3001: AM DET, AM DET LOAD, AGC

NOTE

Refer to Ch. 2, para. 5 for detailed explanation.

Accessories: The following are available for use with the RA6217 series of receivers:

RA6337	LF Adapter, 3 kHz - 980 kHz.
RA6366	Panoramic Display Unit
RA6367	Twin Version of series RA6366
MA6355	Crystal Oscillator Unit
MA6317	Synthesizer, phase lock type
MA6315	Synthesizer, filter mixer type for high speed frequency transitions
RA6377	Comparator for off-the-air measurement of frequency
MA168	Diversity Switch
RA6298	ISB Adapter
RA6397	Antenna Filter Unit

*RA6217A
**RA6217A-3

CHAPTER 2 - INSTALLATION

2.1 GENERAL

After unpacking the receiver, a careful examination should be made for any visible signs of damage. Mounting holes are provided in the front panel for mounting the unit either in a standard 19" relay rack or cabinet. Adequate ventilation should be provided to prevent the operating temperature from exceeding 55°C. All power and RF connections are on the rear panel of the receiver (see figures 2-1 and 2-2).

2.2 POWER SUPPLY (MA.6302 ONLY)

Ensure that the voltage selector switch located on the rear panel is in the correct position; i.e. down for 230 volts or up for 115 volts and that the switch locking plate is secured. Determine that fuses F1301 (0.5 amps) and F1302 (1.0 amps) have the correct rating. Optional supply modules are described in Sect. I, Chap. 5, Para. 19, 20 and 21.

2.3 ANTENNA

RF input J201 located on the rear panel is designed to match a 75 ohm unbalanced transmission line.

2.4 AUDIO OUTPUTS

(1) A 10 milliwatt headphone jack is located on the front panel.

(2) Two 600 ohm outputs, one at 10 mw and one at 1 mw are connected to the rear panel terminal strip TB101.

2.5 EXTERNAL CONNECTIONS (MAIN CHASSIS)

The following input and output connections are located on the rear panel of the receiver:

(1)	J102-1 MHz (output) J103-1 MHz (input)	For an external standard 1 MHz or diversity operation.

NOTE: When operating the receiver with an external 1 MHz standard it is necessary to remove the internal 1 MHz crystal.

(2)	J106-2nd VFO input (3.6-4.6 MHz) J107-2nd VFO output (3.6-4.6 MHz)	For diversity operation or, for external synthesizer inputs, or for use with the RA6366 Panoramic Adapter.
(3)	J105-RF input (2-3 MHz) J104-RF output (2-3 MHz)	Input from an LF Converter. For use with RA6366 Panoramic Adapter.
(4)	TB101 - 8 position terminal block	For external connections.

2.6 EXTERNAL CONNECTIONS (IF PACKAGE)

(1) J3002 - 455 kHz OUT (RA6217A), 100 kHz OUT (RA6217A-3)	For ancilliary equipment.
(2) J3003 - 1.145 MHz IN/OUT (RA6217A), 1.5/1.7 IN/OUT 100 kHz (RA6217A-3)	Output for Diversity; Input for use with Synthesizer.
(3) J3004 - 1.6 MHz OUT	To RA6366/RA6367 Pan. Adapters when used.
(4) TB3001 - AGC Bus Terminal	For Diversity Operation.
AM Detector LOAD AM Detector OUT	Linked externally except for certain Diversity operations.

2.7 EXTERNAL CONNECTIONS (RF PACKAGE)

(1) J201 - RF input	Antenna Connection.

2.8 IF CONVERTERS

(1) RA6217A - 455 kHz output, crystal frequency 1.145 MHz.

(2) RA6217A-3 100 kHz output, crystal frequency 1.500 MHz.

As well as the 455 kHz or 100 kHz IF outputs, these converters provide facilities for master/slave operation in diversity systems or for the injection of an external synthesizer or frequency standard.

For master/slave operation, remove the crystal in the slave unit and connect the crystal output from the master receiver (1.500 or 1.145 MHz) to the slave unit.

CHAPTER 3 - OPERATION

SECTION I - CONTROLS AND INDICATORS

3.1 CONTROLS AND INDICATORS

Table 3-1 gives the controls and indicators for the RA6217A/ RA6217A-3 receivers and their functions; these controls and indicators are shown in the frontispiece.

Table 3-1. Controls and Indicators

Control or Indicator	Function
Function Switch	When rotated to any position other than OFF, connects receiver to power source and selects desired receiver function. The positions and functions are as follows:
Position	Function
OFF	Turns receiver off.
MAN	AGC is disabled; receiver operates normally with manual control of IF, circuits by RF gain control.
AGC: -SH	Receiver operates with automatic gain control (AGC) with short time constant. RF gain control operative but normally set at maximum.
-MED	Receiver operates with AGC with medium time constant. RF gain control operative but normally set at maximum.
-LG	Receiver operates with AGC with long time constant. RF gain control operative, but normally set at maximum.

Table 3-1. Controls and Indicators (Cont'd)

Control or Indicator	Function
Function Switch.....	
Position	Function
CAL.	In this position, 100 kHz markers provide an audio beat at each 100 kHz interval of the kHz digital readout. The readout scale may be corrected in the area of the nearest 100 kHz checkpoint by using the CAL-FINE TUNE control. (The DET.-BFO MODE switch should be in the A.M. Position).
CHECK BFO	In this position, the beat frequency oscillator (BFO) frequency may be set to coincide with the IF center frequency by setting the DET.-BFO MODE switch to the O position and adjusting BFO TUNE kHz dontrol.
RF ATTEN Control	Provides control of the level of all incoming signals when unwanted signals are present which cannot be sufficiently rejected by tuning the antenna.
RF TUNE (Inner Control)	Tunes the antenna for maximum sensitivity of the desired signals. The presence of very strong signals anywhere within the spectrum may cause cross-modulation unless the antenna is tuned. NOTE: Avoid tuning the input to interferring signals instead of the desired signal.
RF RANGE (Outer Control)	Provides for the selection of any one of five frequency ranges (1-2, 2-4, 4-8, 8-16, 16-30 MHz) or a wide band (WB) position. Two wide band positions are provided for ease of operation.
2ND VFO EXT. - INT. Switch	Selects either the internal 2nd variable frequency oscillator (VFO), or an external 3.6 to 4.6 MHz source from a master receiver.

Table 3-1. Controls and Indicators (Cont'd)

Control or Indicator	Function
RF LEVEL - AF LEVEL Switch	Switches the meter to monitor either RF or audio frequency (AF) signal levels.
CALIBRATE/FINE TUNE Control	Enables the kHz digital readout to be calibrated at discrete 100 kHz points or to correct small tuning errors when the kHz control is locked. (Internal VFO only.) NOTE: The RA6217A-3 receiver has a separate coarse control (screwdriver adjustment).
MHz Control	This control selects the desired MHz frequency (0 to 29) as indicated on the first two digits of the readout. Its setting should be checked periodically to insure that it is reasonably centered with respect to the band in use. This is indicated by a reduction in signal or noise on either side of the correct setting. This control can be locked by rotating the outer ring in a clockwise direction. When the MHz readout is set to zero, switches are actuated to permit use of the low frequency converter (when provided) to extend the frequency range down to 3 kHz.
kHz Control	This control selects the last three digits of the readout (0 to 999). This control can be locked by rotating the outer ring in a clockwise direction. The remaining digit in the readout will indicate either a decimal point (.), a plus sign (+), or a minus sign (-).

Table 3-1. Controls and Indicators (Cont'd)

Control or Indicator	Function
kHz Control	When the decimal point appears, the frequency can be read directly; when the minus sign appears, the true frequency can be determined by subtracting one from the units digit on the MHz readout (first number to the left of the minus sign). Conversely, when the plus sign appears, the true frequency can be determined by adding one to the MHz units digit.
Detector Mode Switch	Selects circuit used for demodulation and range of BFO tuning for use in conjunction with TUNE control. The positions and functions are as follows:
Position: FM	Function: Selects a frequency discriminator to demodulate a received FM signal.
Position: SSB+1.5	Function: Selects the circuit required to demodulate the LSB of a received SSB signal.
Position: SSB-1.5	Function: Selects the circuit required to demodulate the USB of a received SSB signal.
Position: AM	Function: Selects diode demodulation for the detection of a received AM signal.
Position: BFO (+6 to -6)	Function: Five positions are used in conjunction with the TUNE control to provide a BFO tuning range of 8 kHz to demodulate keyed continuous wave (CW), frequency-shift-keying (FSK), facsimile, etc.

Table 3-1. Controls and Indicators (Cont'd)

Control or Indicator	Function
BFO TUNE Control	This control operates as a vernier for the five BFO coarse positions on the DETECTOR MODE switch and has a range of approximately ± 3 kHz.
IF BW kHz Switch	This control selects any one of five IF bandwidths which are determined by crystal filtering. The control setting, bandwidth, and its usual corresponding received signal are listed below:

Setting	Bandwidth	Signal
0.2	0.2 kHz	CW
1	1.0 kHz	CW or FSK
3	3.0 kHz	AM or SSB
6	6.0 kHz	AM
13	13.0 kHz	FM or AM

AF LEVEL Control	This screwdriver adjustment control sets the AF level in separate stages for feeding a 600-ohm, 1-milliwatt line. It is unaffected by the position of the AF GAIN control. CAUTION: It is desirable that the AF LEVEL control never be turned toward its maximum position (fully clockwise) unless the output transformer is suitably terminated.
RF GAIN (Inner Control)	This control is operative both in the MAN and AGC positions of the function switch. In the MAN position, the control setting should always be at a minimum consistent with a satisfactory AF LEVEL.

Table 3-1. Controls and Indicators (Cont'd)

Control or Indicator	Function
RF GAIN (Inner Control) Cont.	With the function switch in any of the three AGC positions, reducing the RF gain also reduces the AGC gain which degrades the AGC characteristics. Therefore, when the function switch is in any of the AGC positions, the RF GAIN control should be set to maximum. A possible exception to this occurs when receiving interrupted signals in which the carrier is periodically switched off. In this case, receiver noise could be troublesome during the off intervals.
AF GAIN (Outer Control)	This control adjusts the gain to the headphones and the 10-milliwatt output on the rear panel.
DIMMER Control	This screwdriver adjustment control adjusts the digital readout light intensity.
PHONES Jack	Provides means of connecting a headset to the receiver.
Signal Level Meter	Monitors either RF or AF signal level, depending on position of RF LEVEL - AF LEVEL switch.
Rear Panel (MA6302/MA6304 Power Supply):	
115/230 VAC Switch	Line voltage selector switch used to select either 115-volt AC or 230-volt AC primary circuit.
Fuse F1301-0.5 AMP	Line fuse.
Fuse F1302-1.0 AMP (MA6302)	Power transformer secondary.
Fuse F1302 -1.5 AMP (MA6304)	Power transformer secondary.

CHAPTER 3

SECTION II - OPERATION

3.2 GENERAL

Reference to Section I, Controls and Indicators, should be made before operation of this equipment is started.

3.3 OPERATION

3.3.1 PRELIMINARY OPERATION

(1) Connect an antenna to the RF INPUT J201 at the rear of the receiver.

(2) Turn the knobs to the following positions.

RF RANGE	WB
RF ATTEN	MIN
Function Switch	AGC MED
MHz	05
2nd VFO	INT
METER	RF LEVEL
kHz	500
DETECTOR MODE	-1.5
IF BW kHz	3
AF GAIN	FULLY CLOCKWISE
RF GAIN	FULLY CLOCKWISE

(3) Connect a headset to the PHONES jack (adjust the AF GAIN to a desirable level), and slowly turn the kHz dial clockwise. Signals should be heard as the dial is turned. These signals are in the 5 MHz band as denoted by the 05 at the left hand side of the window. The numbers at the right hand side denote in kHz the frequency of the signal in the 5 MHz band. For example, if the numbers showing are 05.582 the receiver is tuned to 5.582 MHz.

NOTE

The frequency mentioned above as 5.582 MHz will only be accurately measured if the receiver kHz scale is calibrated. The receiver has a built in crystal calibrator to enable the operator to calibrate the kHz scale each 100 kHz. The MHz section of the frequency read out does not need to be calibrated as small movements of this dial do not affect the receiver frequency.

3.3.2 CALIBRATION OF RECEIVER KHZ COUNTER

The calibration capability of the receiver will enable the operator to measure the frequency of any signal he receives by calibrating the kHz dial at the nearest 100 kHz point to the signal frequency he wishes to measure. The accuracy of this measurement will be within 1 kHz.

(1) Switch the knobs as follows:

Function Switch	CAL
2ND VFO	INT
DETECTOR MODE	AM
IF BW kHz	3
AF GAIN	AS DESIRED
RF GAIN	FULLY CLOCKWISE
kHz	500
METER	RF LEVEL
CALIBRATE/FINE TUNE	Set to midrange initially

The front panel meter should have some deflection and an audio note should be heard from the headset.

(2) Turn the CALIBRATE/FINE TUNE knob until the pointer on the meter peaks.

NOTE

A null will be heard as the CALIBRATE/FINE TUNE knob is turned to change the audio output from a high tone to a low tone. Continued tuning will result in no audio output, this quiet region is referred to as a zero beat note. Turning the knob still further in the same direction will result in a low tone changing to a high one.

(3) The correct calibration point is at this zero beat point. Check that the scale is set to 500 and adjust the CALIBRATE/FINE TUNE knob for the zero beat.

(4) Turn the kHz dial to change the reading to 600. A zero beat should occur within 1 kHz of 600. This slight error may be corrected for at this point by setting the reading to 600 and adjusting the CALIBRATE/FINE TUNE for a zero beat.

(5) Turn the kHz dial to the other calibration points not yet covered, i.e. 700, 800, 900, 1000, 400, 300, 200, 100 and 0. At each of these points it should be possible to obtain a zero beat by adjusting the CALIBRATE/FINE TUNE knob with the correct reading in the window.

3.3.3 CHECK BFO

The BFO in the receiver can be set to exactly the center of the IF passband by setting the function switch to the CHECK BFO position.

(1) Set the receiver controls as follows:

Function Switch	CHECK BFO
2nd VFO	INT
BFO MODE	0
IF BW kHz	3
AF GAIN	AS DESIRED
RF GAIN	FULLY CLOCKWISE
kHz	530
METER	RF LEVEL

Under the above conditions, a zero beat note should be heard when the BFO TUNE knob is near the center of its range. The kHz dial should not be set near a 100-kHz point as a wrong beat note will be heard.

(2) The BFO TUNE control will vary the frequency by 3 kHz on either side of the number set by the BFO Mode switch. In this case (BFO set at 0), the frequency will shift from minus 3 kHz to plus 3 kHz. These frequency changes should be heard in the headset. When the BFO Mode switch is at the +6 position, the frequency will change from +3 to +9 kHz; when the BFO has been centered and a zero beat note obtained this may be used as a standard to measure the frequency of a signal.

With the BFO centered, and the BFO mode switch at 0, a zero beat will be heard when a signal is passed over. The frequency reading of the counter will be the frequency of the transmission if the kHz dial is calibrated as detailed in paragraph 3.3.2.

NOTE

When CW signals are being received, the BFO TUNE control should be adjusted to give an acceptable beat note.

3.3.4 CALIBRATION OF MHz COUNTER

(1) Set the controls as follows:

RF RANGE	WB
RF ATTEN	MIN
Function Switch	AGC MED
MHz	01
2ND VFO	INT
METER	RF LEVEL
kHz	500
DETECTOR MODE	-1.5
IF BW kHz	3
AF GAIN	AS DESIRED
RF GAIN	FULLY CLOCKWISE

(2) Plug a headset into the PHONES jack; a noise or signal should be heard.

(3) Turn the MHz dial towards 02. The noise output should noticeably reduce in passing from 01 to 02 and rise to a peak at 02. This rise of noise at each setting of the MHz number indicates that the receiver is tuned to that band, when tuning this control the optimum setting is at the peak of the noise output.

(4) Check that there is a rise of noise at each setting from 01 thru 29.

NOTE

Due to a drift eliminating loop the receiver may be used anywhere within the rise of noise area.

(5) The receiver is now ready to receive signals.

3.3.5 OPERATING THE RECEIVER WITH HIGH-GAIN ANTENNA - UNDER HIGH NOISE/STRONG SIGNAL LEVEL

When the receiver is used with a high-gain antenna, noise input to the receiver may be excessive or strong signals may be present. Perform the following steps to reduce the noise level.

(1) Position the function switch to an AGC position.

(2) Position the meter switch to the RF LEVEL.

(3) Observe the meter deflection; indicates noise or strong signal.

(4) Position the RF ATTEN switch as required until the meter deflection is reduced to zero or a nominal level.

NOTE

The sensitivity of the receiver is not effected.

3.3.6 SEARCHING FOR SIGNALS IN WIDEBAND

(1) Position the controls as follows:

RF RANGE	WB
RF ATTEN	AS DESIRED
2ND VFO	INT.
BFO Mode	0
BFO TUNE	AS DESIRED
IF BW kHz	3
AF GAIN	AS DESIRED
RF GAIN	FULLY CLOCKWISE
Function Switch	AGC MED

(2) Set the MHz number to the desired MHz band by adjusting for the maximum rise of noise. Tune the kHz control from 0 thru 1000 kHz. Signals should be heard across the band. Each signal passed over will produce an audio output. The form of this audio output will depend on the type of signal being received and will dictate which position of the DETECTOR MODE switch to use and the optimum bandwidth to select once a desired signal has been found.

3.3.7 TUNING THE ANTENNA - WB MODE

3.3.7.1 Antenna Tuning - Normal Signal Level

When searching for signals in the wideband mode, the entire spectrum from 1 thru 30 MHz is present at the front end of the receiver; therefore, overloading (jamming) of the receiver can occur.

In order to prevent the receiver from overloading, an antenna peaking circuit is provided in the receiver. When this is correctly used, only the desired signal and those close to it are allowed into the receiver.

The antenna peaking circuit is divided into bands and is controlled by the switch labeled RF RANGE. Each band covers a range of frequencies marked on the front panel. For example, 16-30 covers the frequency range from 16 MHz thru 30 MHz. Any frequency between the limits of this band is selected using the RF TUNE control.

The correct way to use the RF TUNE control is as follows:

(1) Select the desired signal using the RF TUNE control with the RF RANGE switch in the WB position.

(2) Position the RF RANGE switch to the band that includes the desired frequency.

(3) Adjust the RF TUNE control until the signal level is peaked.

3.3.7.2 Antenna Tuning - High Signal Level

When a large interfering signal is causing an unwanted output, there is a possibility that the unwanted signal will be tuned.

The following procedure should be performed:

(1) Select the desired signal using the RF TUNE control with the RF RANGE switch in the WB position.

(2) Position the RF RANGE switch to the band that includes the desired frequency.

(3) Adjust the RF TUNE control until the noise signal level is peaked.

(4) Position the RF ATTEN switch to MAX.

(5) Tune for the desired signal.

(6) Return the RF ATTEN switch to a desired level.

3.3.8 USE OF RF GAIN CONTROL AND AGC

The AGC positions of the function switch refer to automatic gain control. When a large signal is being received there is a danger that overloading will occur, resulting in distortion. The solution to this problem is to reduce the gain of the receiver until overloading stops. When the function switch is in the MAN position, the receiver gain is effected using the RF GAIN control.

When the function switch is in AGC mode, the gain of the receiver is automatically reduced, making it unnecessary for the operator to use the RF GAIN. The control is still operative under these conditions but should not normally be used. An exception to this is when receiver noise increases during the no-transmission period; signals such as CW and SSB will exhibit these characteristics. The use of the AGC will help to reduce the effects of fading, which result in the strength of a signal varying at the antenna. For large signals wide variations at the antenna will not be noticed at the output.

The SH, MED and LG refer to the short, medium and long time constants associated with the discharge times of the AGC circuitry. The type of signal being received will govern the time constant being used.

3.3.9 RECEPTION OF AM SIGNALS

An AM signal refers to one which is amplitude modulated. This type of signal normally carries voice or music and is widely used by local radio stations in the 535 kHz thru 1.6 MHz band. International broadcasts will also be found between 6 MHz and 21.7 MHz.

When searching for signals, as described in paragraph 3.3.6, some signals will be found that have voice or music on them along with a beat that sounds like a whistle (carrier). Switch the DETECTOR MODE switch to AM. The whistle should disappear leaving the broadcast coming through clearly. The RF level meter may be used to tune in the signal. If desired the antenna may be tuned as described in paragraph 3.3.7.

The minimum bandwidth setting of the IF BW kHz control for AM signals is 3 kHz, but wider bandwidths will produce more clarity in the sound heard, providing adjacent signals do not produce interference. The function switch should be set to AGC to reduce the effect of fading. The time constant used is not generally important for AM.

3.3.10 RECEPTION OF CW SIGNALS

A CW signal refers to one which is a continuous wave signal. Morse code transmissions fall into this category where a continuous wave is switched on and off to produce a series of dots and dashes.

To receive CW, the BFO MODE switch should be in the 0 position. The BFO TUNE control should be adjusted to produce a desirable tone.

The IF BW kHz control should be positioned for the narrowest bandwidth for CW, either 0.2 kHz or 1.0 kHz to reduce the effects of interference from adjacent signals.

For hand keyed CW the function switch should generally be used in the MAN position with the RF GAIN control adjusted for a reasonable audio output. The long AGC time constant may also be used if the breaks in transmission are short.

For high speed Telegraphy the function switch should be used in the AGC SH position to reduce the effects of fading and to make use of the short discharge time of the AGC.

The BFO is also used for the demodulation of FSK and Facsimile type signals using associated equipment. When a very stable BFO is required the +1.5 or -1.5 positions of the DETECTOR MODE switch should be used. The kHz control should then be slightly offset to give the desired output.

3.3.11 RECEPTION OF SSB SIGNALS

3.3.11.1 Upper Sideband Signals (USB)

USB is essentially an AM signal with the lower sideband rejected at the transmitter. The signal may have a full carrier, a pilot carrier, or a suppressed carrier transmitted with the sideband.

The DETECTOR MODE switch should be set to -1.5, IF BW kHz to 3, and the kHz dial tuned to obtain a maximum output at the desired frequency, (the output will probably sound garbled and unintelligible). While listening to this output adjust the CALIBRATE/FINE TUNE knob slowly until the signal sounds clear and intelligible. The USB signal is now tuned in. Any one of the three AGC positions may be used for this type of signal. The RF GAIN control may be used to reduce the receiver noise output when pauses in the transmission occur.

3.3.11.2 Lower Sideband Signals (LSB)

The procedure for receiving LSB signals is identical to that of USB except that the DETECTOR MODE switch is set to the +1.5 position.

3.3.12 RECEPTION OF FM

The FM position of the DETECTOR MODE switch allows reception of frequency modulated signals. This is narrow band communications FM and should not be confused with Broadcast FM which is in the VHF bands.

The bandwidth of the FM output will be limited by the IF BW kHz switch setting and should be set to the widest position consistent with the deviation on the FM signal being received.

The receiver should then be tuned as if an AM signal were being received.

CHAPTER 4 - THEORY OF OPERATION

SECTION I - GENERAL

4.1 GENERAL

With the aid of figure 4-1, this chapter briefly describes the basic theory of operation. For a more complete discussion of the receiver and its drift-cancelling frequency selection systems, refer to the detailed circuit description in Section II of this chapter.

Incoming RF signals are amplified and fed to the first mixer where they are mixed with one output from the first VFO to produce an output spectrum centered on 40 MHz approximately 1.0 MHz wide at the output of the 40-MHz bandpass filter (BPF).

The output of the first VFO is also fed to the 'Harmonic Mixer' M4, where it is mixed with harmonics (up to the 32nd) of the 1.0 MHz crystal oscillator. The output circuit of the Harmonic Mixer restricts the useful settings of the 1st VFO to intervals of 1.0 MHz; that is when the 1st VFO frequency minus a 1.0 MHz harmonic produces a difference of 37.5 MHz. This signal is amplified, filtered, and mixed with the 40-MHz 1st IF spectrum in the 2nd mixer to produce a wideband 2nd IF output between 2 and 3 MHz.

Thus, if the 1st VFO drifts, an equal change occurs in both the 40-and 37.5-MHz channels and the drift is cancelled in the 2nd Mixer. The stability of this frequency selection system is therefore that of the 1.0 MHz crystal. The 1st VFO is set by the Megahertz dial of the receiver and acts as an electronic bandswitch.

The 2 to 3 MHz converted spectrum is fed to a conventional single superheterodyne interpolation receiver employing a final IF of 1.6 MHz and tuned by the 2nd VFO (3.6 to 4.6 MHz).

The complete receiver is tuned by varying the frequency of the 1st and 2nd VFO, no physical bandswitching is used. Double-tuned antenna coupling circuits are available for use as required.

4.2 RF UNIT

The incoming signal passes via a variable attenuator, lowpass filter, and optional double-tuned filter to the first RF amplifier stage. The input circuits include a fuse, spark gap, and clamp diodes to provide overload protection. Two stages of RF amplification are used with coupling networks effective from 1 to 30 MHz. Gain is controlled by variable emitter degeneration to ensure that the signal handling capability is not degraded, the control is delayed to give an adequate overall signal-noise performance.

4.3 1st MIXER AND 40-MHZ FILTER

Two transistors are used in the 1st Mixer which is balanced so that the 1st VFO heterodyne signal tends to cancel at the signal input and IF output

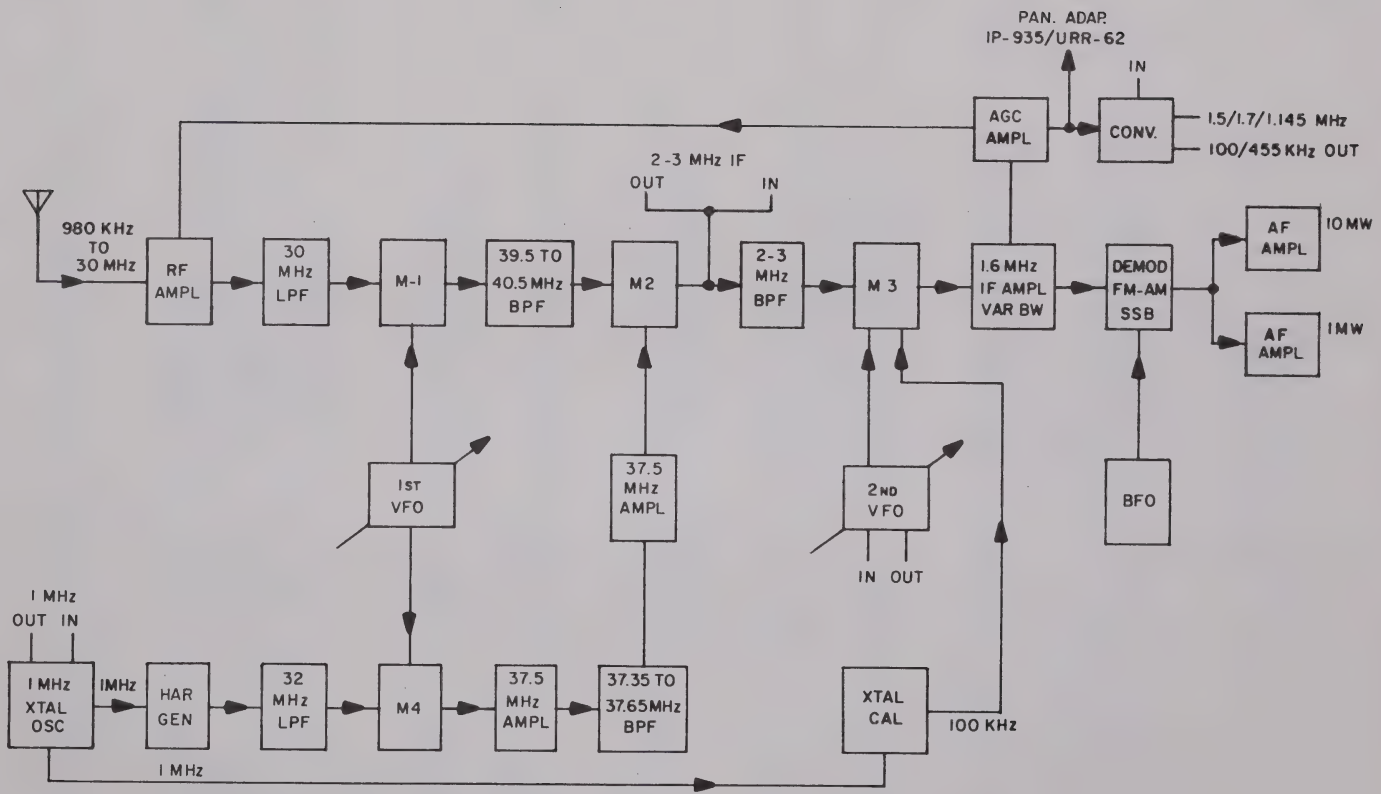

Figure 4-1. Simplified Block Diagram of Radio Receiver Type RA6217A/RA6217A-3

ports, thus reducing the possibility of oscillator leakage along the signal paths. This configuration also discriminates against spurious responses which may arise due to harmonic production with large signals at even order submultiples of the 40-MHz IF. The 40 MHz BPF consists of eight cascaded tuned circuits and is approximately 1.3 MHz wide at -6 dB, the extra bandwidth over the required 1.0 MHz allows for drift of the 1st VFO to occur without degradation of performance.

4.4 2nd MIXER

This module includes a conventional single transistor mixer stage, a cascode 37.5-MHz amplifier stage and a 2 to 3 MHz bandpass filter. The filter is so arranged that a rejection notch occurs at 1.6 MHz and gives maximum protection against interpolation receiver IF breakthrough, etc.

4.5 3rd MIXER

This module includes a balanced diode ring mixer with large signal handling capability. The mixer is fed with a heterodyne signal from the 2nd VFO via a 3.6 to 4.6-MHz bandpass filter and suitable amplifiers. The mixer output is fed via a double-tuned 1.6 MHz transformer to an amplifier stage and an external crystal filter which defines the widest final IF passband (the RA6217A crystal filter is 13 kHz)*. A 100-kHz signal derived from the 1.0 MHz crystal oscillator is fed to the third mixer when required to check the interpolation receiver frequency calibration or BFO.

* Special versions of the receiver include 60 kHz bandwidth filters.

4.6 1st VFO (Alternate MA6358)

This module provides suitable buffered outputs to the 1st and Harmonic (4th) mixers. The oscillator operates over the frequency range 41.5 - 69.5 MHz and enables the required input spectrum to be selected together with an appropriate 37.5 MHz signal from the Harmonic Mixer. The variable element in the oscillator circuit is a straight line frequency capacitor which is mechanically coupled via suitable gearing to the Megacycles control and indicator.

The MA6358 replaces the variable oscillator in receivers suitable for remote control and contains 29 crystal oscillators selectable by DC contact closure.

4.7 2nd VFO

A carefully compensated oscillator operating in the frequency range 3.6 to 4.6 MHz provides outputs via buffer stages to the 3rd mixer and to an output socket at the rear of the equipment so that master and slave operation with a companion receiver is possible. Facilities are also provided to enable the oscillator to be switched off and the module fed from an external synthesizer or other suitable source. The main variable element in the oscillator circuit is a straight line frequency capacitor which is mechanically coupled via anti-backlash gearing to the Kilocycles Control and Indicator. A Calibrate-fine tune control consisting of a small multi-turn potentiometer is provided to enable the Kilocycles indication to be corrected at discrete 100-kHz points or to enable the receiver to be fine tuned when the main controls are locked.

4.8 1 MHZ OSCILLATOR AND CALIBRATOR

This crystal oscillator and its harmonics govern the accuracy of the frequency conversion system. Facilities are provided for operation from an external standard source if required. Master and Slave operation with another receiver is also possible. The oscillator output is fed via suitable buffer stages to the Calibrator circuit, 37.5 MHz generator module, and rear sockets. The Calibrator circuit contained in the module consists of a 10:1 digital divider which can be switched as required to provide a standard 100-kHz signal (and Harmonics) to enable the 2nd VFO frequency calibration and BFO to be checked and corrected.

4.9 37.5 MHZ GENERATOR

A transistor harmonic generator is used to produce a spectrum of harmonics from the 1.0 MHz input signal. The Harmonic filter is lowpass and serves to attenuate harmonics above the 32nd which are not required in the frequency conversion process. This spectrum and an output from the 1st VFO are fed at suitable impedances and levels to the Harmonic mixer stage M4 and produce a wanted output at 37.5 MHz from the beat between the 1st VFO and each 1 MHz harmonic in turn as the VFO is tuned through the range.

A tuned cascode 37.5 MHz amplifier raises the required signal level and feeds the 37.5 MHz filter module.

4.10 37.5-MHZ BANDPASS FILTER

This module houses a bandpass filter consisting of seven coupled tuned circuits. The -6 dB bandwidth is approximately 300 kHz to allow for a small amount of drift to occur in the 1st VFO without significant effect on the receiver performance, and the skirts fall steeply to a high level of ultimate attenuation.

4.11 1.6 MHZ FINAL IF ASSEMBLY

This assembly consists of various sub-modules and boards as follows:

4.11.1 1st 1.6 MHz IF Amplifier

A sub-module containing the crystal filter assemblies, 1st 1.6 MHz IF Amplifier and bandwidth selector switch.

4.11.2 2nd, 3rd, and 4th IF Amplifiers

A sub-module containing the 2nd - 3rd and 4th amplifiers. AGC is applied to the 3rd amplifier and operates by emitter degeneration (as in the RF stages) but is so arranged that the control contribution made by this stage occurs before the RF stages start to control, thus providing for (S+N) to Noise Ratio to improve with increasing signal to an acceptable level. The amplifiers are tuned but heavily damped and relatively wideband compared with the crystal filter pass-bands.

4.11.3 AGC Board

This board accommodates two tuned amplifier stages. The first provides outputs to the second, the IF output converter, and an output to a rear socket at 1.6 MHz (75 ohms). The second is a relatively high level amplifier feeding the AGC detector and averaging network. An emitter follower provides a low impedance output from the AGC detector circuit and is coupled via diodes to the time-constant determining components and AGC rear connection. A series circuit combining a DC Amplifier plus emitter follower provide a low impedance AGC bus, a potentiometer is provided for setting the "no signal" control conditions.

4.11.4 Demodulator Board

This board accommodates an amplifier feeding the diode (envelope) detector in the AM channel, and a product detector together with alternative BFO circuits in the CW and SSB channel. The AM detector load is taken to a link on the rear panel of the equipment. Three separately selectable oscillators are available for the BFO function providing IF +1.5 kHz, IF -1.5 kHz (crystal controlled) and IF ±8 kHz variable with coarse and fine controls. Emitter follower and amplifier circuits are used to isolate the BFO in use from the product detector and to minimize pulling effects. Audio outputs are taken via the main chassis cableform and the DETECTOR/BFO mode switch to a separately mounted emitter follower which drives separate gain controls feeding the Line and Headphone AF amplifiers. The various demodulator functions are controlled from the DETECTOR/BFO Mode switch assembly, while the BFO TUNE control is for the variable BFO.

4.11.5 FM Demodulator Boards

This circuit includes a crystal oscillator operating at 1.72 MHz which is used in conjunction with the product detector to provide an input at 120 kHz to limiter and pulse counting discriminator stages. The resultant AF output is fed via the DETECTOR/BFO Mode switch to the AF gain controls and amplifiers.

4.12 AF AMPLIFIER BOARD

Two separate AF amplifiers provide outputs for Line and Headphone operation. The 10 mw Headphone amplifier uses a preamplifier and push-pull output stage, the 1.0 mw Line output employs a single stage amplifier. Negative feedback is applied to both stages. AF outputs are provided to rear terminals and a front panel headphone jack socket.

4.13 IF OUTPUT CONVERTER

This optional module houses a mixer together with suitable filter, amplifier, and crystal oscillator stages for the particular output frequency required. Standard modules provide outputs at 100 or 455 kHz. Inputs and outputs are available for master and slave operation if required; alternatively, an external heterodyne signal can be employed.

4.14 POWER SUPPLY MODULES

Various plug-in modules may be employed. The AC operated unit uses a conventional series stabilizer circuit which takes account of supply voltage and load variations and is temperature compensated. Operation at a nominal 117 or 234 volts is possible, the appropriate condition being selected by a guarded switch.

CHAPTER 4 - THEORY OF OPERATION

SECTION II - DETAILED CIRCUIT DESCRIPTION

This section contains the detail circuit description of the receiver. Figure 7-1 is the overall diagram of the receiver and figures 7-2 through 7-21 are the component schematics.

NOTE

The RA6217A has a 455 kHz IF and the RA6217A-3 has a 100 kHz IF output.

4.15 R. F. UNIT (FIGURE 7-2)

4.15.1 ANTENNA CIRCUIT

The input inpedance at the antenna socket J201 is nominally 75 ohms unbalanced; incoming signals are fed via a 500 ma. fuse F201 and 30 MHz low-pass filter to the antenna attenuator and R. F. range switch. The fuse and associated spark-gap E201 serve as overload protection devices, the low pass filter attenuates signals above 30 MHz coming from the antenna and also helps to prevent unwanted leakage to the antenna from the receiver. The antenna attenuator has five positions and provides a means of attenuating all incoming signals in nominal 10 db steps over the range 0-40 db. The RF range switch S202, has seven positions; two wideband positions are provided for operator convenience, in these settings signals are fed via the wideband transformer T205 and coupling capacitor C215 to the base of the first RF amplifier transistor Q201. Resistor R210 provides the correct terminating impedance for the antenna and low pass filter under these conditions. The five remaining switch positions are used to select double-tuned input circuits as required, each circuit tunes over a frequency range slightly greater than one octave using the coil assemblies T201 through T206 and the ganged variable capacitor C211A and B. These circuits are aligned by means of adjustable ferrite cores in each coil and the trimming capacitors C207, C208, C209, C210, and C212. C228 is a trimmer common to all secondary windings and is used to determine the frequency range covered by C211. The tuned primary and secondary coil windings are tapped to provide the correct input and output inpedances and also a satisfactory compromise between selectivity and overall noise figure.

4.15.2 RF STAGES

Two RF amplifier stages are employed and mounted together with associated circuits on the printed circuit board TB204. The selected input signal spectrum is applied to the base of the first RF amplifier transistor Q201 via the coupling capacitor C215. The diode CR202 protects Q201 against accidental overload. AGC and/or manual gain control is provided via the transistor Q202 which acts as a variable emitter impedance with a value depending on the DC circuit conditions. The DC conditions corresponding to maximum gain are set by the potentiometer R215 with -4 volts applied to the AGC line. Under these conditions, Q202

has a low collector impedance and little degeneration occurs in the emitter of Q201. The action of the AGC circuits is to cause the AGC voltage to move toward zero thereby increasing the collector impedance of Q202 and decreasing the gain of Q201. The control characteristic is made more linear by the clamp circuit consisting of R217, CR201, R212 and the zener diode VR201.

4.15.3 30 MHz LOW PASS FILTER

The output circuit of the first RF stage is a 30 MHz low pass filter consisting of coil and capacitor assemblies A201 and A202 with terminating resistors R220 and R225. These serve to couple the amplified input spectrum via C223 to the base of Q203. The second RF stage Q203-Q204 operates similarly to the preceding stage and is coupled to the following first mixer stage by C225 and the 30 MHz low pass filter assemblies A203 and A204. This type of interstage coupling is used in both cases to enable the RF amplifiers to operate over the frequency range 1-30 MHz in the Wideband mode and to give protection against first IF breakthrough at 39.5 - 40.5 MHz. It also provides protection against first mixer image frequencies in the range 80-110 MHz and affords maximum rejection to the first VFO fundamental and harmonics, preventing leakage back to the antenna.

4.16 FIRST-MIXER AND 40 MHz BANDPASS FILTER (FIGURE 7-3)

4.16.1 FIRST MIXER

Transistors Q301 and Q302 are arranged as a balanced mixer with the signal input and 40 MHz IF output circuits balanced. The first VFO heterodyne signal is applied unbalanced to the emitters. Thus the VFO injection frequency tends to cancel at the signal input and output ports and even order input signal harmonics produced in the mixer tend to cancel at the output port. R311 functions as a mixer balance control. Signals from the RF amplifier module are applied to the primary of the unbalance to balance transformer T301. The secondary of T301 is loaded by R304 and R305 which provides an effective center tap for the balanced signal spectrum applied to the mixer. The collector load is balanced with respect to ground by C309, C310 and forms the first section of the 40 MHz bandpass filter (first IF). DC is applied to the mixer collectors via R312 and the center tap on L301. The first VFO heterodyne signal in the range 41.5 - 69.5 MHz is applied in phase to the respective emitters via C304-C305 at such a level that mixing takes place. The required output spectrum in the range 39.5 - 40.5 MHz is selected by the following bandpass filter.

4.16.2 40 MHz BANDPASS FILTER

This filter consists of eight overcoupled tuned circuits in cascade, L301 through L308 and C309 through C138. The passband is made slightly wider than the necessary 1 MHz to allow for possible drift in the first VFO and consequent shift of the required first IF spectrum. The skirt characteristics fall sharply to a very high level of ultimate attenuation. The filter input is balanced to match the first mixer requirements and an output is provided from a low impedance tap at the junction of C317 and C318 to feed the second mixer.

4.17 FIRST VARIABLE FREQUENCY OSCILLATOR (FIGURE 7-4)

This circuit is a Hartley type oscillator consisting of a variable inductance L1, capacitors C1, C2 and trimmer C3 which oscillates over the frequency range 41.5 - 69.5 MHz. Tuning is accomplished by varying C1, a straight line frequency capacitor, which is mechanically coupled to the megacycles control, and alignment with the digital readout is accomplished by adjusting the core of L1 and trimming capacitor C3. The oscillations are sustained by Q1 and fed to two separate amplifiers, Q1-Q2 on A1 and Q1-Q2 on A2. Stage A1 provides a buffered output which is fed to the first mixer which stage A2 feeds the harmonic mixer M4.

4.18 1 MHz CRYSTAL OSCILLATOR AND CALIBRATOR (FIGURE 7-5)

4.18.1 1 MHZ CRYSTAL OSCILLATOR

The 1 MHz signal determined by crystal Y601 and its associated capacitors may be set precisely on frequency by adjusting trimming capacitor C620. This signal is amplified by transistor Q604 and fed via low impedance coupling to two separate 1 MHz amplifiers, Q603 and Q602. The 1 MHz signal amplified by Q603 is then fed via coil assembly A601 to the harmonic generator while the other amplifier Q602 provides two outputs; one to the calibrator and the other to a 1 MHz rear panel output. The coil of A601 is adjusted for a minimum signal at 1 MHz allowing the useful harmonics appearing across R615 to be fed to the harmonic generator. Transistor Q601 provides suitable buffering for a 1 MHz signal from an external frequency standard.

4.18.2 CALIBRATOR

This circuit consists of a 10 to 1 digital divider which provides a 100 kHz signal to the third mixer. The 1 MHz reference input signal is fed via R624 to pin 5 of the integrated circuit digital divider ML1. R625 and R626 provide a suitable DC bias potential at pin 5. R627, R628 and C622 provide a filtered DC operating potential between pins 4 and 7.. The 100 KHz square wave output from pin 1 is fed via R629, C625 and the diode switch CR601 to the third mixer module. C624 functions as a simple low pass filter. The calibrator circuit is brought into operation by the application of -16 VDC via the system switch to E616. R630, R631 provide a DC potential to the diode switch CR601.

4.19 37.5 MHz GENERATOR (FIGURE 7-6)

4.19.1 HARMONIC GENERATOR

The 1 MHz signal and its harmonics from the crystal oscillator are fed to transistor Q701 via diode CR701 and trimmer capacitor C728 which is used to equalize the relative amplitudes of the harmonic spectrum. The harmonics are then further amplified here and passed to the 32 MHz low pass filter.

4.19.2 32 MHz LOW PASS FILTER (HARMONIC LPF)

The megacycle harmonics are fed through the four section Darlington type filter network to prevent unwanted harmonics from passing to the harmonic mixer M4. The resistor R704 and the potential divider R705 - R706 provide the correct termination impedances for the filter.

4.19.3 HARMONIC MIXER, M4

Transistors Q702 and Q705 are arranged as a balanced mixer so that the harmonic spectrum and the input from the first VFO tend to cancel in the output circuit. Balance adjustment is provided by R709. The harmonic signal is applied to the base of Q702 via the potential divider R705, R706 and C717; also to the emitter of Q705 via C720. The first VFO signal is fed to the base of Q705 via C719 and also to the emitter of Q702 via C718. The required 37.5 MHz output is then fed via the filter assembly A701 to the first 37.5 MHz amplifier.

4.19.4 37.5 MHz AMPLIFIER (1)

This tuned cascode amplifier consisting of Q703, Q704 and filter assembly A702 amplifies the wanted 37.5 MHz signal while attenuating any unwanted products from the preceding mixer. The amplified signal is then fed via a low impedance link to the following 37.5 MHz bandpass filter assembly.

4.19.5 37.5 MHz BANDPASS FILTER (FIGURE 7-7)

The bandpass filter consists of seven undercoupled tuned circuits in cascade, providing a high degree of attenuation to signals outside the nominal 300 kHz passband. A low impedance output feeding the second mixer module is provided from a capacitive divider C807, C808 on the last tuned circuit.

4.20 SECOND MIXER (FIGURE 7-8)

4.20.1 37.5 MHz AMPLIFIER

The filtered 37.5 MHz signal is further amplified by the tuned cascode amplifier consisting of transistors Q501 and Q502. The tuned transformer assembly A501 serves to couple the amplified signal at low impedance to the emitter of the second mixer Q503.

4.20.2 2ND MIXER

Transistor Q503 combines the 37.5 MHz signal with the 39.5 - 40.5 MHz 1st IF spectrum from the 1st mixer module to produce a wideband 2nd IF output between 2 and 3 MHz. This wideband spectrum is then fed to the 2-3 MHz bandpass filter.

To clarify this frequency selecting system examples of dial settings and intermediate frequencies corresponding to various input signals are given below:

Dial Settings		Signal Freq.	VFO-1	Crystal Harmonic	1st IF	Het Freq.	2nd IF
MHz	kHz	f_s MHz	f_o MHz	nf_c MHz	$f_o - f_s$	$f_o - nf_c$	$nf_c - f_s$
4	1000	5.0	44.5	7th	39.5	37.5	2.0
5	0	5	45.5	8th	40.5	37.5	3.0
18	600	18.6	58.5	21st	39.9	37.5	2.4
18	700	18.7	58.5	21st	39.8	37.5	2.3
18	800	18.8	58.5	21st	39.7	37.5	2.2

4.20.3 2-3 MHz BANDPASS FILTER

This filter limits the output spectrum from the second mixer to the required frequency band of 2-3 MHz and sharply attenuates frequencies outside this range. One of the rejection notches is arranged to occur at 1.6 MHz to reduce the possibility of breakthrough at the 3rd intermediate frequency. The filter input termination is formed by the resistor chain R511, R104 and the 75 ohm captive termination. (R104 and the captive termination are mounted at the rear of the main chassis and provide suitable feed points to the RA6366 Panoramic Adapter and from the RA6337 Low Frequency Adapter.) A low impedance feed to the third mixer module is provided from the transformer assembly A508. Circuits in the third mixer module are arranged to correctly terminate the filter.

4.21 2ND VFO (FIGURE 7-9)

The second variable frequency oscillator is of the Hartley type and operates over the frequency range of 3.6 - 4.6 MHz. The oscillator consists of transistor A1Q1, the tapped inductance L1, two fixed temperature compensating capacitors C5 and C6, a trimming capacitor C4 and variable capacitor C3. Two variable-capacitance diodes CR1 and CR2 are connected in series back-to-back across the LC circuit. The control voltage from the CAL-FINE TUNE control is applied through R8 to a tap between CR1 and CR2. The main tuning element C3 is a straight-line frequency capacitor mechanically coupled to the receiver KILOHERTZ control and digital indicator.

The Calibrate/Fine Tune control consists of a 500 ohm multi-turn potentiometer R103 and associated resistor R111 mounted on the receiver front panel. Adjusting this potentiometer changes the DC bias on CR1 and CR2 thus providing a fine control of frequency. The DC supply voltage to R103 is stabilized by the Zener diode A2 VR5.

The oscillator circuit is carefully temperature compensated and the Zener diode combination A1 VR1 through VR4 guards against frequency change due to supply voltage variations.

The oscillator output is taken from a low impedance tap on L1 via the coupling capacitor C7 to diode switch arrangement A2 CR1-CR2. With the oscillator in operation -16 volts DC is applied via the VFO INT/EXT switch on the front panel to terminal 5 on the connector J1, thus supplying DC to the oscillator, forward biasing A2CR1, and reverse biasing A2CR2, to enable the oscillator to drive the first buffer amplifier Q2. When the VFO signal is supplied from an external source the -16 volts DC is transferred from terminal 5 to terminal 4. This disables Q1, forward-biases CR2, reverse biases CR1 and connects the input terminal A1 to the first buffer amplifier Q2.

The output buffer amplifiers Q3-Q4 are fed through capacitors C12 and C15 on the collector load of Q2. Q3 provides an output at 1000 ohms impedance via terminal A2 to feed the third mixer; Q4 provides an output at 75 ohms impedance via terminal A3 to the rear panel suitable for driving a slave receiver or for other external use.

4.22 3RD MIXER (FIGURE 7-10)

The 2-3 MHz spectrum from the output of the second mixer module is fed via the input connector A3, the low pass filter L8, C16, C17, and coupling capacitors C14, C15 to pin 3 of the balanced diode mixer assembly. The function of the LPF is to discriminate against possible leakage of 37.5 MHz and its harmonics from the second mixer. R17 terminates both the LPF and 2-3 MHz bandpass filter in the second mixer module. When the receiver function switch is in the Calibrate or Check BFO positions, a 100 kHz signal from the calibrator circuit is introduced via the input connector A4 and diode switch CR1, to the junction of C14 - C15.

The 3.6 - 4.6 MHz heterodyne signal from the second VFO is fed via the input connector A1 and a bandpass filter consisting of the inductors L1 through L4, and the capacitors C5, C7, C10, C11, to the primary winding of the unbalance to balance transformer T1. L4 is tapped to provide a low impedance out from the filter and R7 determines the filter load. The center tapped secondary winding of T1 provides a balanced signal drive to the push-pull amplifier stage Q2, Q3, which in turn provides the switching signal to pins 1 and 2 of the mixer assembly.

The mixer output is taken from pin 5 of the mixer assembly via C12 to a 1.6 MHz double tuned transformer consisting of the inductors L5, L6 and the capacitors C6, C8 and C9. The inductors are both tapped to suit the respective source and load impedances.

Q1 operates as an amplifier with emitter degeneration provided by R4. The 1.6 MHz amplified signal appearing across the collector load R2 is coupled via C2 to the output terminal A2 and feeds a 1.6 MHz crystal filter which is external to the module and used to determine the widest IF passband.

In the calibrate position the 100 kHz signal from the calibrator is fed via diode CR1 and capacitor C14 to pin 3 of the balanced mixer A1. The strong 100 kHz signal causes useful calibration harmonics to be produced in the mixer. These harmonics (20th - 30th) provide markers at 100 kHz intervals across the 2-3 MHz spectrum and when mixed with the 2nd VFO signal produce a 1.6 MHz signal which is passed to the IF amplifiers. The 16th harmonic of the 100 kHz calibration signal is simultaneously fed to the IF amplifiers and AM detector to provide a reference signal which then beats with the 1.6 MHz signal produced by the mixing process and results in an audio output reducing in frequency to zero beat as the VFO is tuned to the precise 100 kHz points.

In the RA6217A-3, C and E receivers an auxiliary IF output centered at 1.6 MHz with a 75 kHz bandwidth is provided. The signal source is taken from the double tuned transformer L5-L6 via E1 and C32 to the base of amplifier Q4. The passband of L5-L6 has been widened by changing the value of C8 to increase the coupling between L5-L6. Amplifiers Q4 and Q5 are connected in cascade to ensure stability. From Q5 the signal is fed via emitter follower Q6 and the filter L10, C27-28-29 to the auxiliary 1.6 MHz output on the rear panel providing 1 mv output to 50 ohms.

4.23 1ST 1.6 MHz IF AMP (FIGURE 7-11)

The IF signal from the 3rd mixer is fed through the wideband crystal filter to the amplifier stage Q1601 via coupling capacitor C1602. R1601 provides the correct termination for the filter. After amplification the signal passes through tuned coil assembly A1601 which, via dual tapped arrangement, provides two 1.6 MHz outputs. One output is fed directly to the second IF amplifier via the bandwidth selector. The second output is fed at the correct impedance to separate sections of the bandwidth switch providing selection of the desired cyrstal filter. (For bandwidth switching detail, see figure 7-1).

Crystal Filters

Five crystal filters are normally provided as follows:

a) 13 kHz*- Used to determine the widest IF passband and in circuit at all times. *(20 kHz or 60 kHz in some receiver versions.)

b) 6 kHz

c) 3 kHz

d) 1 kHz

e) 0.2 kHz

The appropriate filters are selected by the IF bandwidth selector switch on the front panel of the receiver.

4.24 2ND, 3RD, 4TH IF AMPLIFIERS (FIGURE 7-12 and 7-13)

The second IF amplifier stage consists of Q1, tuned coil assembly A1 and associated circuitry. The 1.6 MHz signal is fed to Q1 via coupling capacitor C3. After amplification it is fed at low impedance via signal Tap 2 on the coil assembly and capacitor C6 to the base of the 3rd amplifier Q3. AGC is applied to this stage via Q2 which provides variable emitter degeneration in a similar manner to that described for the RF stages. Initially the clamp diode CR1 is biased off and the full AGC potential is applied to the base of Q2, as the AGC voltage falls (with increasing signal level) the impedance of Q2 increases and the gain of Q3 is reduced. Most of the gain control contribution made by this stage is arranged to occur before the RF stages start to control thus providing for the receiver overall signal to noise ratio to improve with increasing signal to an acceptable level. When the AGC voltage has fallen to approximately 2.5 volts, CR1 starts to conduct and in conjunction with R2 limits the effect of further AGC potential changes on the stage gain.

The tuned coil assembly A2 provides two tapped outputs; one of which is fed to buffer amplifier Q4 via capacitor C10 and the other 1.6 MHz output to the 1st AGC amplifier. The 4th IF amplifier Q4 provides a buffered 1.6 MHz signal which is then fed via the tuned coil assembly A3 at a suitable input level to both the AM detector and product detector. The gain of Q4 is pre-set by adjustment of R19.

4.25 AGC AMPLIFIER (FIGURE 7-14)

The first AGC amplifier Q1401 is fed from the 3rd IF amplifier via coupling capacitor C1402. AGC threshold adjustment is provided by potentiometer R1403. The 1.6 MHz signal is fed via tuned coil assembly A1401 and capacitor divider network to the 2nd AGC amplifier. It is also fed to a rear panel connector which must remain terminated (75 ohm captive termination) unless otherwise employed. A third output is provided for the IF output converter. (See paragraph 31). The second AGC amplifier comprised of Q1402 and tuned coil assembly A1402 increases the 1.6 MHz signal level to feed the AGC diode detector CR1401 and emitter follower Q1403. Resistors R1411, R1412 and capacitors C1411 and C1412 provide and RF filtering and averaging network. Emitter follower Q1403 provides a low impedance DC source to feed the time constant determining networks in the AGC line. Under "no RF signal" conditions, current flows through Q1403 producing a potential drop across R1413 such that diodes CR1402 and CR1403 are reversed biased relative to the potential on the AGC time constant network established by the adjustment of R1415. The function of the AGC detector is to produce a negative going voltage at the base of Q1403 such that the potential drop across R1413 is reduced. When the potential drop across R1413 is more negative than that established on the time constant network, the diodes CR1402-CR1403 will conduct and tend to reduce the current flowing in the DC amplifier Q1404. Then, the potential drop across the DC amplifier collector load resistor R1420 will fall towards ground. This potential change is fed to the emitter follower stage Q1405 and then via the RF/IF gain control and further emitter follower stage Q1406 to the AGC buss. The function of diodes CR1403, CR1402 is to act as a voltage operated switch to enable the time constant capacitors to charge quickly and to discharge slowly through the resistive network R1414, R1415, and R1416. The choice of time constant is selected by the function switch. The junction of these diodes (CR1402-CR1403) is taken to a rear panel connector to permit diversity operation of two receivers with a common AGC action. Thermistor RT1401 provides temperature compensation for DC amplifier Q1404.

4.26 DEMODULATOR BOARD (FIGURE 7-15)

4.26.1 AM DETECTOR

1.6 MHz signals from the 4th IF amplifier are fed via coupling capacitor C1202 to amplifier Q1201 and then to the diode detector assembly A1201.

The detected AM signal is taken via an RF choke, L1201 and a rear panel link (TB-1, 2-3) to the DETECTOR/BFO mode switch through detector load resistors R17 and R16. It is then fed to the emitter follower audio input terminal E1903. Here audio gain and line level potentiometers are provided to adjust the signal level before it is fed to the audio amplifiers.

NOTE

Two receivers may be connected for diversity operation by feeding the detected AM signals obtained in this stage to a common detector load and following stages in one of the two receivers.

4.26.2 PRODUCT DETECTOR

The 1.6 MHz signal from the 4th IF amplifier is also fed to the base of the product detector Q1202 via coupling capacitor C1204; while the BFO signals are applied to the emitter via the emitter follower stage Q1203 and buffer amplifier Q1204 and then mixed in the product detector with the incoming 1.6 MHz signal to provide an output at audio to the AF stages or at 120 kHz to the FM limiter and pulse counting discriminator stages.

4.26.3 BEAT FREQUENCY OSCILLATOR

Three separate oscillators are available for CW and SSB operation. The BFO circuit consisting of Q1205, capacitors C1220, C1221, C1222, coil assembly A1202 and trimming capacitor C1219 uses varicap C1223 as a vernier (BFO tune kHz) for the five coarse positions on the BFO mode switch. The oscillator frequency is adjusted ± 2 kHz by controlling the DC voltage at the varicap using potentiometer R5. The coarse positions (+6 to -6) are selected by inserting suitable potential dividers in the DC control circuit using the BFO mode switch. Thus control of the variable oscillator is provided over the range of 1.6 MHz ± 8 kHz.

4.26.4 SSB INSERTION OSCILLATORS

The crystal controlled insertion oscillator consisting of Y1201, Q1206 and associated circuitry provides a frequency of 1.5985 MHz which when used with the incoming 1.6 MHz IF signal provides a -1.5 kHz reinserted carrier to demodulate USB signals. Trimmer capacitor C1228 is used to "pull" the oscillator on frequency. In a similar manner, the crystal oscillator consisting of Y1202, Q1207 and associated circuitry provides a frequency of 1.6015 MHz which when used with the 1.6 MHz IF provides a +1.5 kHz reinserted carrier to demodulate LSB signals. ON/OFF control is provided by the DET-BFO mode control which switches the -16 volts DC to either oscillator.

NOTE

The 3 kHz receiver bandwidth would normally be used for SSB.

The diode CR1201 serves as an electronic switch to isolate the crystal oscillators from the variable BFO.

4.27 METER ZERO AND EMITTER FOLLOWER (FIGURES 7-1, 7-16, 7-17)

In the RF position the "S" meter is connected between the AGC line and a point of pre-set potential determined by R1905 which is used to set the meter zero under no signal conditions. The meter is calibrated to indicate signal strength in dB relative to 1 microvolt input.

NOTE

Only with the IF gain control set at maximum is the correct calibration on the "S" meter maintained.

In the AF level position, the meter is connected across the 1 mw AF output via switch S104 and diode bridge CR101. See Figure 7-1. The red line indicates an AF output of 1 mw into 600 ohms.

The emitter-follower stage Q1901 is fed from either the diode, FM or product detector depending on the setting of the DET/BFO mode switch.

The stage presents a high impedance load to the appropriate detector and provides a low impedance output to feed the audio gain control R19B and line level pre-set potentiometer R20. See Figure 7-1.

4.28 AUDIO AMPLIFIERS (FIGURE 7-17)

4.28.1 LINE OUTPUT STAGE

An AF input taken from the wiper of the pre-set AF level control potentiometer is fed via R1517 and C1511 to the base of Q1503. A link is provided to enable C1510 to be included in parallel with C1511 to preserve the response to the lower audio frequencies if required. Negative feedback is provided from the collector to the base of Q1503 by R1513. T1502 serves to couple the amplified (1 mw) AF signals to the line output terminals.

4.28.2 AUDIO OUTPUT STAGES

An AF input taken from the wiper of the manual AF gain control potentiometer is fed via R1500 and C1501 to the base of Q1500. A link is provided to enable C1502 to be included in parallel with C1501 to preserve the response to the lower audio frequencies if required. Negative feedback is provided from the collector to the base of Q1500 by R1503. T1500 provides a balanced AF drive to the following push-pull output stage Q1501, Q1502. R1508 and R1511 provide negative feedback over the respective amplifier transistors. T1501 provides a balanced load for the amplifier and an impedance match to the AF output (10 mw 600 ohm) terminals and phone jack.

4.29 FM INSERTION OSCILLATOR (Figures 7-15, 7-18)

Q1 functions as an oscillator with the frequency closely controlled by the crystal Y1 at 1720 kHz. The 16 volt negative supply line is switched on by the DET/BFO mode switch in the FM position. This causes the diode CR1 to conduct, the oscillator to function, and applies a DC voltage via R1 to the output (E1) together with the 1720 kHz signal via C1. The DC voltage causes the diode switch CR1201 on the detector board to conduct and applies the signal to the product detector Q1202 via the buffer stages Q1203, Q1204. The capacitor C1231 which is effectively between E1 and ground is an essential part of the oscillator circuit.

The product detector output centered on 120 kHz (1720 minus 1600 kHz) is fed to the input terminal E3 of the FM discriminator board.

4.30 FM DISCRIMINATOR (FIGURE 7-19)

The frequency modulated RF output centered on 120 kHz is fed via a 1.6 MHz trap circuit (L1, C17, C1) to the base of a buffer amplifier Q1. The output

from Q1 drives the amplifier Q2 so that amplitude pulses appearing at the collector of Q2 are fed via C9 and CR1 to trigger the monostable multivibrator Q3, Q4. The time constant governing the output pulse duration is set by C10, R12, R13. R13 is adjustable and is set for optimum discriminator linearity. The output pulses are taken from the collector of Q4 via C12 and CR2, and tend to charge C13 to an extent proportional to the pulse rate. Since the number of pulses varies in sympathy with the frequency modulation, an AF component appears across C13 and is fed via the filter network R18 R19, R20, C14, C15, C16 to the output terminal E5.

4.31 IF OUTPUT CONVERTER (FIGURES 7-20, 7-21)

The RA6217A receiver has a 455 kHz IF output (Figure 7-20) and the RA6217A-3 has a 100 kHz IF output (Figure 7-21). The circuit description given in the following paragraphs describes the 455 kHz IF circuit.

The 1.6 MHz IF input signal derived from the AGC amplifier board is fed to the base of the mixer Q1803. The capacitor C1808 forms part of a signal potential divider and determines the correct input signal level. The crystal oscillator Q1801, Y1801 operates at 1.145 MHz and can be adjusted to the precise frequency by C1806. A low impedance output to drive the following buffer amplifier Q1802 is provided from the capacitive divider C1804 - C1805. If required, an output can be obtained from this point via C1802 and the input-output connector J3003 to drive a companion receiver. Conversely, an external signal can be fed to J3003 in which case the crystal oscillator should be stopped by the removal of Y1801.

The buffer amplifier Q1802 functions to provide isolation between J3003 and mixer Q1803, and to provide a suitable heterodyne signal level to the emitter of Q1803 via C1810. The wanted output from the mixer at 455 kHz (1.6 - 1.145 MHz) is selected by the double-tuned filter A1801, A1802, C1815, in the collector of Q1803. The filter coils are tapped to provide the correct input and output impedance levels. C1815 is used to couple the tuned circuits which are damped to ensure an adequate passband response.

The output amplifier stages Q1804, Q1805 are fed via C1818 and R1819. Negative feedback is provided via R1820 to ensure good linearity. The output tuned circuit A1803 is tapped to suit the collector and output impedance requirements.

4.32 POWER SUPPLY MA6302 (FIGURE 7-22)

The fused (F1) AC power supply is filtered by capacitors C1 and C2 and taken to the voltage selector switch S1. The switch connects the split primary windings of T1 in series for 234 volts or in parallel for 117 volt operation. The secondary winding is also fused (F2), and feeds two bridge connected full wave rectifiers CR1 (Regulated) and CR5 (unregulated).

The bridge rectifier CR1 feeds resistor-capacitor filter R2, C3, C4 and then a preregulator comprised of Q1, CR2, CR3, CR4, R3 and R4. The pre-regulator provides a constant current to the collector of the DC comparison amplifier Q3 and the base of control amplifier Q2. The comparison element Q3 takes a sample of the output voltage derived from VR1 and produces a signal proportional to the difference.

This signal is amplified by Q2 and applied to the series regulator Q4 to control the output voltage. Potentiometer R7 is used to adjust the output voltage to 16 volts. In the event of regulator failure the receiver is protected by the zener diode VR2 (18 volts) from serious voltage overload.

The second bridge rectifier CR5 provides 16 volts unregulated for ancillary equipment.

POWER SUPPLY MA6304 (FIGURE 7-22a)

The fused (F1) AC power supply is filtered by capacitors C1 and C2 and taken to the voltage selector switch S1. The switch connects the split primary windings of T1 in series for 234 volts or in parallel for 117 volt operation. The secondary winding is also fused (F2), and feeds two bridge connected full wave rectifiers CRI (Regulated) and CR2 (Unregulated).

The bridge rectifier CR2 feeds the capacitor bank C1, C2. Components R1, VR1, R2, R3, and C1 provide a constant voltage of -19.6v at the junction of VR1 and R2. The base current to the Q1 (2N722) is provided through R2 and R3 from a constant voltage source. A reference voltage is established by the constant current through R4 into VR2. The comparison element Q2 samples of the output voltage (at the base) and the reference (at the emitter) and produces an output proportional to the difference at the collector. This signal is amplified by Q1 (2N722) and the Q1 (2N3055) emitter follower series regulator to control the output voltage.

Potentiometer R6 is used to adjust the output to -16 volts. In the event of a regulator failure the receiver is protected by the zener diode VR1 (1N2983RA) from serious overload.

The second bridge rectifier CR1 provides -16 volts nominal unregulated.

CHAPTER 5 - MAINTENANCE

5.1 GENERAL

This chapter contains the maintenance requirements for the receiver.

5.2 SIMPLE FAULT LOCATION

The following procedure is intended as a guide to determine the location of possible faults in the receiver and is based on simple listening tests and observations.

(1) Turning the RF/IF gain control while observing the RF level meter reading from approximately zero with the control fully clockwise to approximately full scale with the control fully counter-clockwise. This will generally indicate the presence of correct voltages on the B minus and AGC lines.

(2) Assuming the receiver is not completely dead, some noise should be heard in the headset when the RF and AF gain controls are set to maximum.

(3) The receiver calibrator, 1 MHz oscillator, IF amplifiers, Detector, BFO and AF stages can be checked with the function switch set to the Check BFO position. A beat note should be heard which varies in pitch according to the setting of the BFO controls and in amplitude in accordance with the gain control settings.

(4) It should be possible to set the AF level control so that 1 mw is indicated on the AF level meter with the line output terminated by a 600 ohm load, (under conditions setup in (3)).

(5) The relative IF sensitivities can be checked for each position of the bandwidth switch.

(6) The complete interpolation receiver can be checked with the function switch in the Calibrate position -- a beat note should be heard as the second VFO (kHz control) is tuned through each 100 kHz point (DET-BFO mode switch set to AM).

(7) As the first VFO is tuned through each MHz position the receiver noise output should increase; indicating that the first VFO, 37.5 MHz generator and second mixer are operating.

(8) Connecting an antenna and tuning the input by setting the RF range and RF tune controls should result in an increase in signal (or noise) as the RF tune control is peaked at the tuned frequency.

(9) Absence of a DC path between the antenna connection and ground may indicate a blown antenna protection fuse.

5.3 REQUIRED TEST EQUIPMENT

Table 5-1 lists the test equipment required to perform the maintenance procedures given in this chapter.

Table 5-1. Test Equipment

Headset	Impedance: 600 ohms
RF Signal Generator, Hp 606A	Freq. Range: 1 to 45 MHz Output: 0.1 uv to 1 volt Output Impedance: 50 to 75 ohms
AF Signal Generator, Hp 200AB	Freq. Range: 100 Hz to 15 kHz
VTVM, Hp 400D	Voltage Range: 1.0 mv to 4.0 v rms Freq. Range: dc to 2 MHz
AF Power Meter, GR1840-A	Freq. Range: 50 Hz to 15 kHz Attenuation: -40 dB to +15 dB
Frequency Counter, Beckman 6146	Freq. Range: 50 Hz to 70 MHz Sensitivity: 100 mv or better
Noise Generator, Marconi TF1106/1	Freq. Range: 1 to 30 MHz Noise figure: up to 10 dB
Wave Analyzer, Hp 302A	Freq. Range: 50Hz to 15 kHz Measuring range: 40 dB minimum
Oscilloscope, Hp 120B	General purpose
Multimeter, Simpson 260	General purpose
RF Voltmeter, Boonton 91H	General purpose
Sweep Generator	Freq. Range: 1 to 7 MHz
Logarithmic Amplifier, Jerrold 500	Freq. Range: 1 to 7 MHz

5.4 ALIGNMENT PROCEDURES

5.4.1 GENERAL INFORMATION

Under normal conditions the receiver will maintain the factory alignment over a long period of time, consequently any other causes of trouble should be eliminated before realignment is undertaken. If it becomes necessary to re-align any part of the receiver only small angular adjustments of any trimmers or tuning slugs should be necessary. When replacing access covers, module shields, etc., ensure that all screws are tightly secured to prevent any spurious signal from affecting the receiver.

5.4.1A Power Supply Alignment

A. Test Equipment Required.
(1) Vacuum Tube Voltmeter (VTVM)

B. Control Settings
(1) Set FUNCTION Switch to MAN.

C. Procedure
(1) Connect VTVM between the -16V REG. terminal on TB 101 (Located on the rear panel) and GND.
(2) Remove R7 cover on the rear of the POWER SUPPLY module.
(3) Adjust R7 for exactly -16VDC on the VTVM.

5.4.2 IF PACKAGE ALIGNMENT PROCEDURE (Figure 5-1, 5-2)

Test Equipment

Signal Generator
Vacuum Tube Voltmeter
Oscilloscope
RF Voltmeter
Frequency Counter

Switch Positions

Function Switch - Manual
Manual Gain Set at Maximum
Mode switch - AM

5.4.2.1 Procedure - 2nd, 3rd, and 4th IF Amplifiers (Sch. Figure 7-13)

(1) Connect the signal generator to the RF input on the IF module, J-3005.

(2) Connect a DC VTVM to terminal 1 on TB1 on rear of the IF package. Set the function switch to the AGC MED.

(3) Tune the signal generator to 1.6 MHz and adjust the generator output for a reading of -6.5 volts on the DC voltmeter with the IF gain set at maximum.

(4) Tune transformer A1701 and A1702 on the second, third and fourth amplifier board for maximum on the voltmeter. Adjust the output of the signal generator to maintain an output of approximately -6.5 volts.

(5) Adjust transformers A1401 and A1402 on the AGC board for maximum, maintaining -6.5 volts on the DC voltmeter by control of generator output.

(6) Connect the RF voltmeter to the junction of C1202 and R1205 on the detector board.

(7) With the signal generator set to 100 microvolts input level, adjust A1703 on the IF amplifier for maximum on the RF voltmeter.

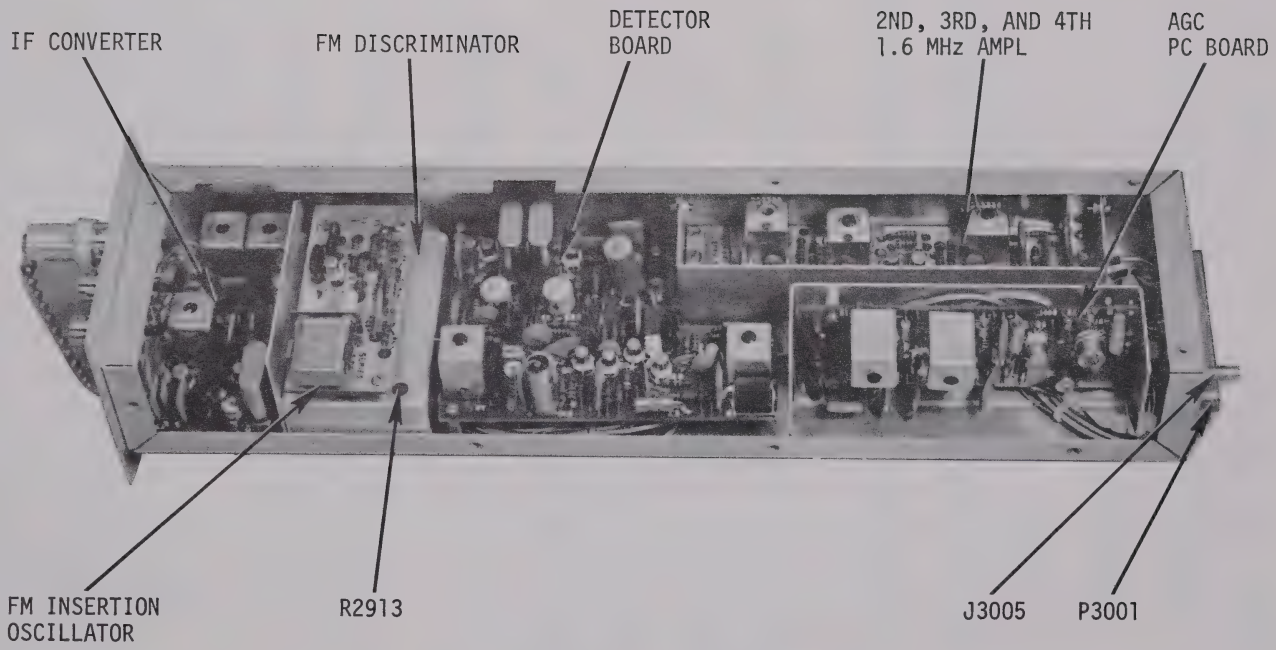

Figure 5-1. IF Package (Cover Removed)

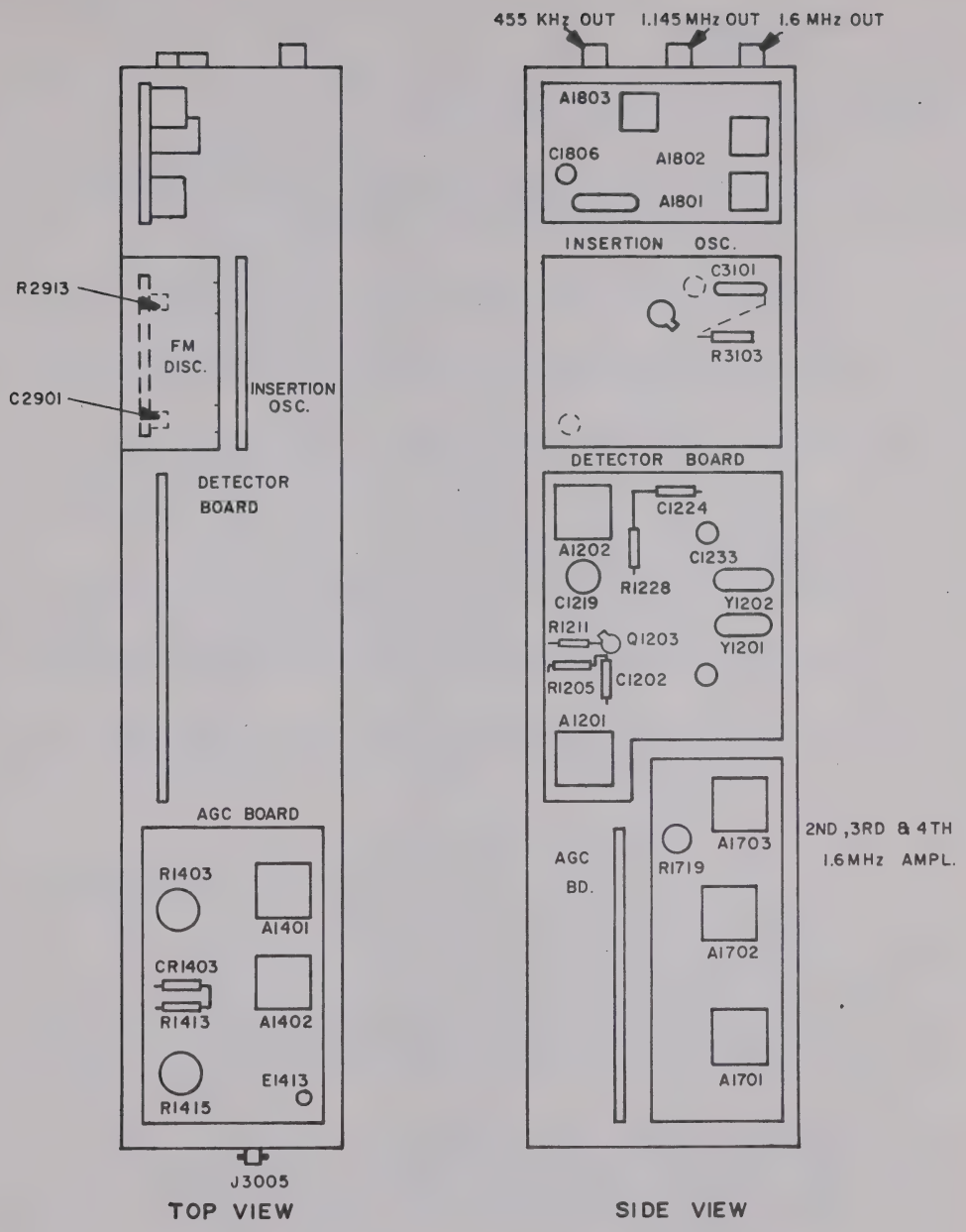

Figure 5-2. IF Package Alignment (Parts Location)

(8) Adjust the R1719 on the IF amplifier board for 8 mv on the RF voltmeter.

(9) Remove the RF voltmeter from the detector board.

5.4.2.2 AGC Amplifier (Sch. Figure 7-14)

(1) Leave the signal generator connected to the RF input on the IF package. Set the generator to minimum output. Switch receiver to AGC, long time constant and connect the chained 75 ohm load to the 1.6 MHz output at the rear of the package.

(2) With no signal input, connect the DC VTVM to the AGC Bus at terminal E1413 and adjust R1415 for -4.0 volts on the AGC Bus.

(3) Disconnect the DC VTVM from the AGC bus and connect it to terminal 1 on TB1 on the rear of the IF package and increase the generator signal until -6.5 volts is read on the DC VTVM.

(4) Adjust A1401 and A1402 for maximum. The manual RF gain control may have to be decreased in order to maintain a voltmeter reading.

(5) Set the manual gain to maximum and set the signal generator for 100 uv output.

(6) Connect the DC VTVM to the AGC buss at E1413 and adjust R1403 until the 4.0 volts begins to go less negative. The correct adjustment is reached when any increase in the signal generator power causes the AGC voltage to be less negative. This adjustment may have to be re-set for the overall receiver test.

*Note: The correct setting for R1403 is reached when any increase in signal generator output causes the -4 volts obtained in (2) above to go less negative.

5.4.2.3 Detector Board (Sch. Figure 7-15)

(1) Connect the signal generator at 1000 uv output to J3005 (the RF input of the IF package.) Set the detector mode to AM, the manual gain control at maximum, and function switch to AGC.

(2) Set the signal generator to 1.6 MHz with 30% AM modulation at 1000 Hz.

(3) Connect the oscilloscope to the AM detector at the rear of the IF package being sure that the AM detector is connected to the AM detector load with the link on the terminals (see rear panel markings.)

(4) Adjust the A1201 for maximum output.

(5) Connect the counter to the junction of R1211 and Q1203 emitter.

(6) Switch the detector switch to the +1.5 kHz and adjust C1233 for 1.601,500 MHz.

(7) Switch the detector switch to -1.5 kHz and adjust C1228 for 1.598,500 MHz.

(8) Connect the DC VTVM to the junction of R1228 and C1224 on the detector board.

(9) Adjust the BFO fine tune for -7.4 volts on the VTVM.

(10) Switch the detector switch to 0 kHz and adjust C1219 for 1.600,000 MHz on the counter. Do not adjust A1202 as this has been preset at the factory.

(11) Switch the detector switch through the other BFO ranges and check that the total BFO range is ±8 kHz.

(12) Disconnect the VTVM.

5.4.2.4 Converter (Sch. Figure 7-20)

(1) Connect the frequency counter to the 1.145 MHz (1.5 MHz) output (J3003)*adjust C1806 for 1.145 MHz (1.5MHz).

(2) Connect the signal generator to the RF input of the IF package and tune 1.6 MHz. Set the generator output to 100 uv and the receiver in the AGC position.

(3) Connect the RF voltmeter with 50 ohms across the meter to J3002 455 kHz output and adjust A1802 and 1803 for maximum output at 455 kHz. The output should be greater than 150 mv into a 50 ohm load. For alternate units the output is 100 kHz.

5.4.2.5 FM Insertion Oscillator and FM Discriminator (Sch. Figures 7-19, 7-12, and 7-1

(1) Connect the RF voltmeter to the junction of R3103 and C1301 and switch the mode switch to the FM position. Check that the voltmeter is reading at least 100 mv.

(2) Connect the signal generator at 1.6 MHz and 1000 uv to the RF input on the IF package (J3005) and switch the receiver to AGC.

(3) Connect the counter to the 1.6 MHz IF output (J3004).

(4) Connect the oscilloscope to the Detector Mode Switch, S2 (B rear) pin 11, or to E1903 (the input to the Emitter Follower and Meter Zero Board in the right front corner of the receiver - see Sch 7-1). Vary the signal generator from 1.606,000 MHz to 1.594,000 MHz, while monitoring the frequency on the counter, and check on the oscilloscope that the descriminator DC output varies 0.25 volts peak-to-peak.

(5) It is unlikely that the condition in (4) above will not be satisfied. If adjustment is required remove mounting screws from the insertion oscillator board to gain access and adjust R2913 through the hole in the cover to establish 0.25 volts DC peak-to-peak for ± 6 kHz.

*Note: The 1.145 MHz (1.5 MHz) output level is typically 20 mv into 50 ohms and may not be sufficient to trigger the counter. If this is the case, use an indirect alternate method such as, set the 1.6 MHz with the counter and then switch the counter to 455 kHz (100 kHz) output and adjust C1806 for the proper frequency.

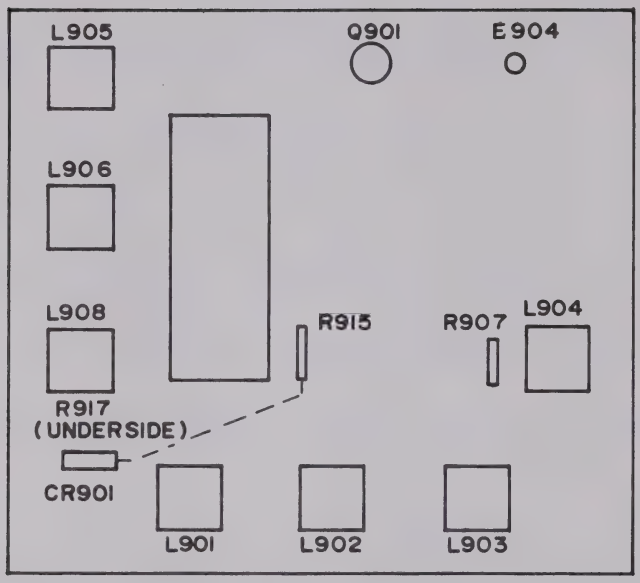

Figure 5-3. 3rd Mixer Alignment (Parts Location)

5.4.3 3rd MIXER ALIGNMENT PROCEDURE (Figure 5-3) (Sch. Figure 7-10)

Test Equipment

Sweep Generator
Logarithmic Amplifier
Oscilloscope
Signal Generator
RF Voltmeter

Switch Positions

Function Switch - Manual
2nd VFO - External
1st VFO - set at 00 MHz

5.4.3.1 Procedure (Alignment in Receiver)

(1) Remove the cover from the 3rd mixer module.

(2) Connect the sweep generator to the 2nd VFO IN jack on the rear panel.

(3) Connect the logarithmic amplifier across R907 and the Log Amp output to oscilloscope vertical input and the DC sweep from the sweep generator to the oscilloscope horizontal input.

(4) Adjust the sweep generator to sweep from 3 MHz to 6MHz. Set sweep generator markers to identify 3 MHz, 3.6 MHz, 4.6 MHz and 5.6 MHz.

(5) Adjust: L902 for min at 3 MHz
L901 for max at 3.6 MHz
L904 for max at 4.6 MHz
L903 for min at 5.6 MHz

Continue the adjustment of L901 through L904 to produce the highest level of signal over the 3.6 to 4.6 MHz bandpass (flat within 3 dB) and attenuation at frequencies above and below the bandpass.

Note: In the event sweep equipment is not available it is possible to adjust the 3.6 - 4.6 MHz BPF using CW technique with the signal generator and RF voltmeter.

(6) Remove the sweep equipment.

(7) Connect the RF voltmeter to the junction of R915 and CR901.

(8) Connect the signal generator to 2-3 MHz input (rear panel). Set the generator to 3 MHz and the attentuator to produce 50 mv on the RF voltmeter.

(9) Tune coil L908 for maximum on the RF voltmeter.

(10) Tune the signal generator from 2-3 MHz and check that the voltmeter does not vary more than 3 dB.

(11) Switch to Internal VFO and set to 500 kHz indication.

(12) Tune the signal generator connected to the 2-3 MHz input to 2.5 MHz at 100 uv.

(13) Connect the RF voltmeter to the base of Q901.

(14) Tune coil L905 and L906 for maximum on the RF voltmeter.

(15) Connect the RF voltmeter to the input of FL1 (rearmost of six IF bandwidth filters located next to the IF module.)

(16) Check that 10 mv at 2.5 MHz produces approximately 10 mv on the RF voltmeter.

(17) Connect the RF voltmeter to the 1.6 MHz wide out on rear panel.

(18) Tune L909 and L910 (on A2 WIDEBAND BOARD) For maximum on the RF voltmeter.

(19) Check that 10 mv at 2.5 MHz produces approximately 20 mv at the 1.6 MHz wide output (REAR panel) on the RF voltmeter (50 ohms).

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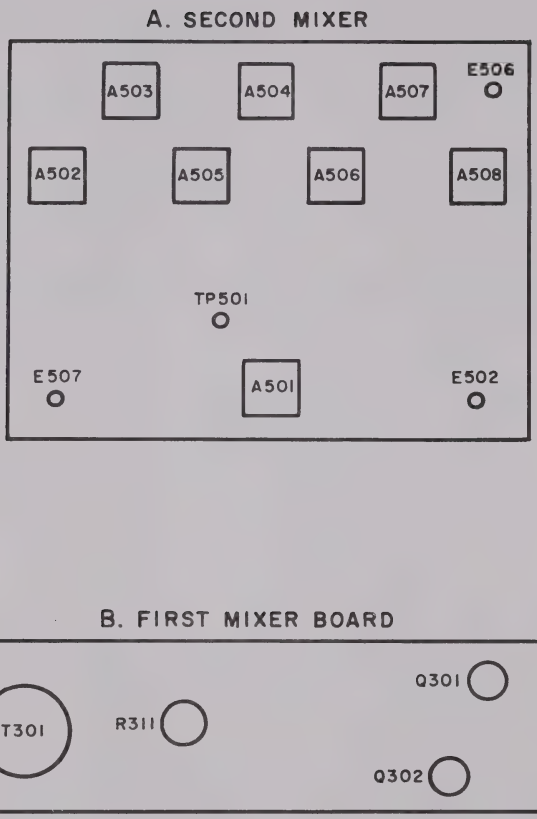


Figure 5-4. 1st and 2nd Mixer Alignment (Parts Location)

5.4.4 SECOND MIXER ALIGNMENT PROCEDURE (Figure 5-4) (Sch. Figure 7-8)

Test Equipment

Signal Generator
RF Voltmeter
Sweep Generator
Logarithmic Amplifier
Oscilloscope
Counter

Switch Positions

Function Switch - Manual
1st VFO - 00 MHz

5.4.4.1 Procedure

(1) Remove the 1 MHz crystal from the 1 MHz module. Connect the RF voltmeter to TP 501. Connect the signal generator to E502.

(2) Set the signal generator to 37.5 MHz ±kHz, check the counter and set to 1200 mv.

(3) Tune coil A501 for maximum on voltmeter. The output should be greater than 30 mv.

(4) Connect the RF voltmeter to E506.

(5) Connect the sweep generator to the 2-3 MHz input on the rear panel.

(6) Connect the Logarithmic Amplifier input to E506 and the Logarithmic Amplifier output to the oscilloscope vertical input. Also connect the sweep generator DC sweep to the oscilloscope horizontal input.

Note: In the event sweep equipment is not available the alignment may be accomplished using CW techniques.

(7) Sweep 1.2 MHz to 4.6 MHz.

(8) Set markers to identify 1.3 MHz, 1.6 MHz, 2 MHz, 2.5 MHz, 3 MHz, 3.6 MHz, and 4.5 MHz.

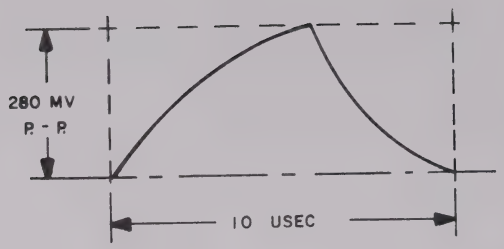
(9) Adjust A502, A505, and A508 for maximum response at 2.5 MHz.

Adjust A507 for minimum at 1.3 MHz
Adjust A504 for minimum at 1.6 MHz
Adjust A503 for minimum at 3.6 MHz
Adjust A506 for minimum at 4.5 MHz

Continue to tune until a 2-3 MHz bandpass flat within 3 dB and large out of band attenuation is produced.

(10) Remove sweep setup.

(11) Connect signal generator to 2-3 MHz input at 2.5 MHz and 60 mv and check that the RF voltmeter on E506 indicates approximately 10 mv.



1 MHz AMP. AND CAL.

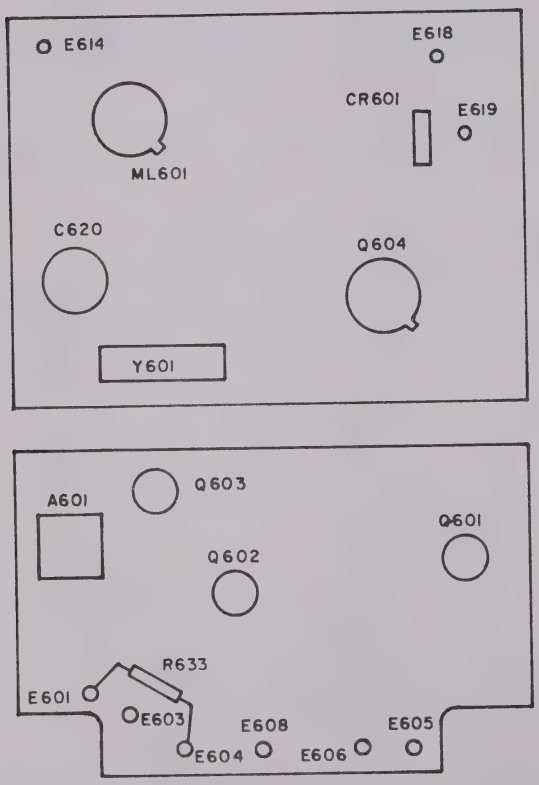


Figure 5-5. 1 MHz Ampl and Calibrator Alignment

5.4.5 1-MHz AMPLIFIER AND CALIBRATOR ALIGNMENT (Figure 5-5) (Sch. Figure 7-5)

Test Equipment

Signal Generator
RF Voltmeter
Frequency Counter
Oscilloscope

Switch Position

Function Switch - Manual

5.4.5.1 Procedure

(1) Insert the 1-MHz crystal and check for approximately 120 mv at terminal E612.

(2) Connect the frequency counter to the 1-MHz output on the rear panel.

(3) Adjust the frequency to 1-MHz with capacitor C620.

(4) Connect the RF voltmeter to E601.

(5) Adjust the coil assembly A601 for maximum, approximately 4 volts.

(6) Connect the RF voltmeter to E603 and check that the 1-MHz level is approximately 120 mv.

(7) Remove the crystal, connect the signal generator to 1-MHz input on rear panel and tune the generator to 1-MHz with the input level at 100 mv.

(8) Check that the level at E612 is approximately 100 mv.

(9) Replace the crystal, and remove the generator.

(10) Connect oscilloscope to E618.

(11) Switch to CAL. Mode.

(12) Observe that the 10:1 Digital Divider is operating and that the output waveform (E618) is approximately 280 mv peak-to-peak (see figure 5-5).

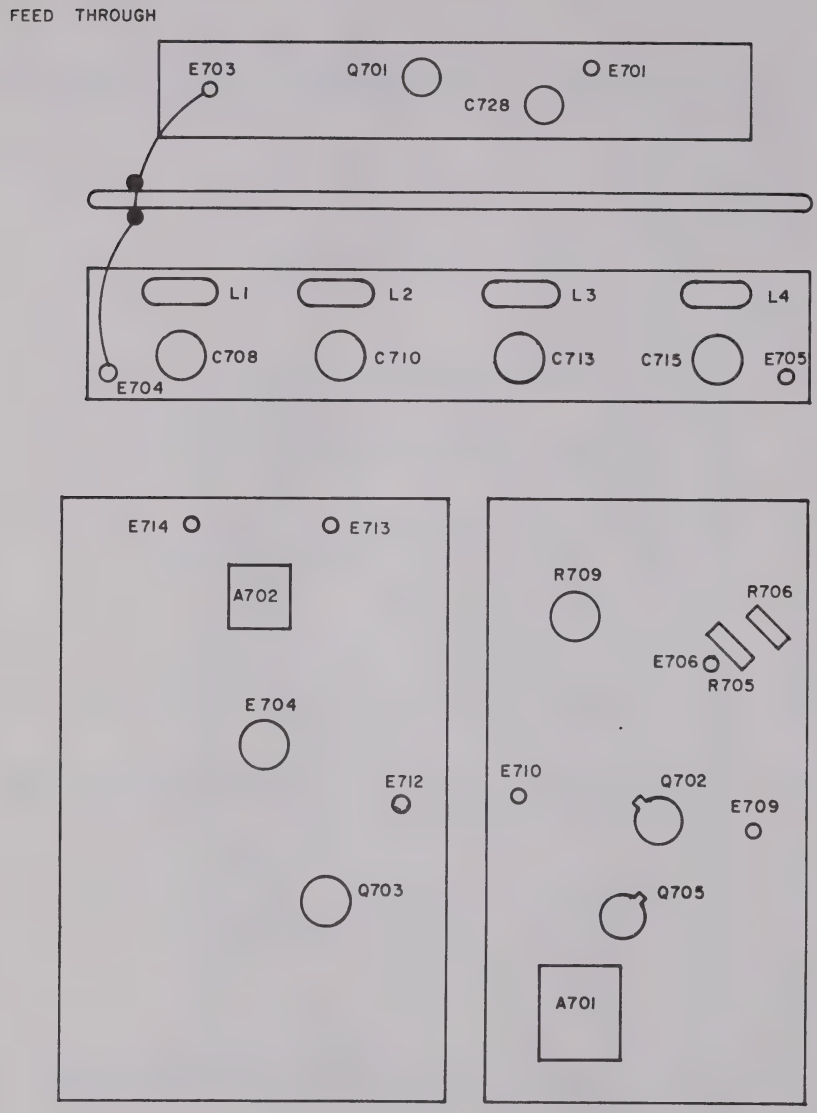


Figure 5-6. 37.5-MHz Generator Alignment (Parts Location)

5.4.6 37.5-MHZ GENERATOR ALIGNMENT (Figure 5-6) (Sch. Figure 7-6)

Test Equipment

Signal Generator
RF Voltmeter

Switch Position

Function Switch - Manual

5.4.6.1 Procedure

(1) Connect the RF voltmeter to E701. This point should measure at least 1.4 volts at 1.0 MHz.

(2) Connect the RF voltmeter to E703 and adjust C728 for a maximum indication.

(3) Disconnect the lead to the lowpass filter at E704 and connect a 390 ohm resistor in series with the signal generator to E704. Monitor E706 with RF voltmeter.

(4) Set the signal generator to a reference level of 250 mv at 1 MHz. Increase the frequency of the generator until the response falls; peak trimmer capacitors C708, C713 and C715. Continue this process until 32 MHz is reached.

(5) Check that the output is 100 mv with a 2 dB ripple across the passband (2 - 32 MHz) and a large attenuation above 32 MHz.

(6) Connect the signal generator to the coaxial cable at E709, and connect the RF voltmeter to E710.

(7) Set the generator to 37.5 at 3 mv and tune coil A701 to 37.5 MHz. Check that at least 30 mv appears at E710.

(8) Connect the RF voltmeter to E713 and tune A702 for approximately 100 mv.

(9) Reinstate link to E704 and connect the RF voltmeter to E706. Check that approximately 2 volts appears at E706.

(10) Set the signal generator to 37.5 MHz and connect it to J111 (first VFO output to the calibrator).

(11) Connect the RF voltmeter to E710.

(12) Adjust R709 for a minimum of the RF voltmeter.

(13) Reconnect the 1st VFO, J111 to P402.

(14) Connect RF voltmeter to 2nd mixer TP1.

(15) Record the level of 37.5 MHz corresponding to each MHz position of the 1st VFO and adjust C708 to a position so that the range of levels is between 30 mv and 100 mv.

5.4.7 37.5-MHZ FILTER (Sch. Figure 7-7)

Test Equipment

Signal Generator
RF Voltmeter
Counter

Switch Position

Function Switch - Manual
1st VFO - set between any MHz points

5.4.7.1 Procedure

(1) Connect the signal generator to the coaxial connector J111, underside of the receiver, and remove the 1 MHz crystal (Y601).

(2) Connect the RF voltmeter to TP501 on the second mixer. (Figure 5-4).

(3) Set the signal generator to 37.5 MHz, ±1 KHz measured by counter, with enough output to obtain a reading on the RF voltmeter. Note: If no output is obtained it may be necessary to attach the RF voltmeter to the 2nd coil (L802) from the input and peak the 1st coil, continuing down the 37.5 MHz BPF (Band Pass Filter) until the output can be read at TP501 on the second mixer.

(4) Peak all coils on the 37.5 MHz BPF.

(5) Adjust R709 (Figure 5-6) on the harmonic mixer for a minimum 37.5 MHz signal at TP501.

(6) Remove the signal generator and replace a 1 MHz crystal.

(7) Tune the first VFO until a peak is reached on the RF voltmeter at 1 MHz. Peak all coils in the 37.5 MHz chain, (L801 through L807), including (A701, A702) 37.5 MHz coils on the (A601) 1 MHz and 37.5 MHz generator module and (A501) on the second mixer module.

(8) Tune the first VFO to all the MHz positions and check that there is at least 30 mv at every MHz position. The output should dip between adjacent MHz positions.

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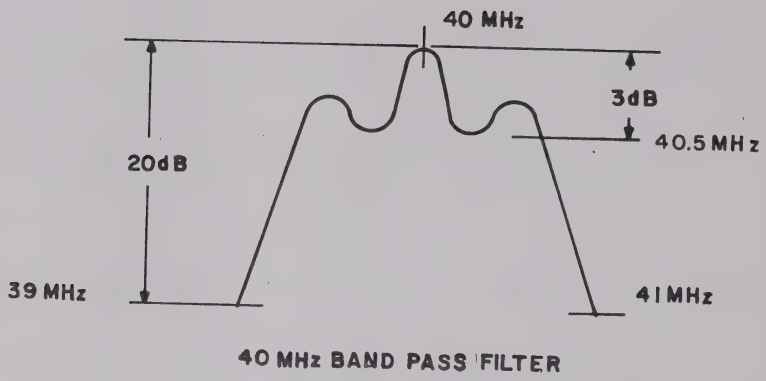


Figure 5-7 Alignment Wave Shapes

5.4.8 1ST MIXER AND 40 MHz-FILTER ALIGNMENT (Figure 5-4 and 5-7) Sch. Figure 7-3)

Test Equipment:

Sweep Generator
Signal Generator
RF Voltmeter
Oscilloscope
Log Amplifier

Switch Positions

Function Switch - Manual
RF Range - Wideband
1st VFO - not on 00

5.4.8.1 Procedure *Caution See Note:

(1) Connect the sweep generator to the antenna input.

(2) Remove the cover of the 2nd mixer.

(3) Connect a 5 pf capacitor in series with the log amplifier and oscilloscope and connect this to E507 on the second mixer board.

(4) Tune the first VFO to 5 MHz and adjust the sweep generator to show a suitable trace. Connect a marker, a loosely coupled generator, to RF input at 5.5 MHz or the log amp at 40 MHz.

(5) Adjust the coils in 40 MHz BPF to produce the waveform shown in Figure 5-7.

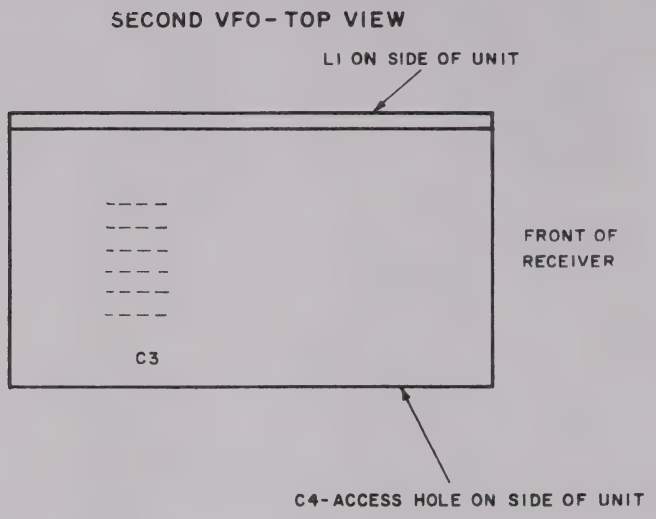
(6) Set the signal generator to 20 MHz and connect it to the antenna input J201.

(7) Connect the RF voltmeter to E507 on the second mixer board.

(8) Set the attenuator on the signal generator for a reading on the RF voltmeter.

(9) Adjust R311 on the first mixer board for a minimum on the voltmeter. Disconnect the signal generator and the RF voltmeter and reconnect J112.

*Note: Caution the alignment of the 40 MHz filter is normally a Factory adjustment. Skill and patience is required. Take reference gain and frequency response curves CW and be sure the filter is not within specifications before attempting alignment.



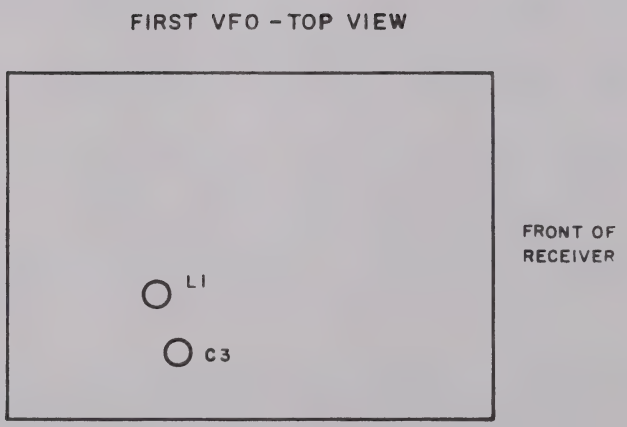


Figure 5-8 1st and 2nd VFO Alignment (Parts Location)

5.4.9 1ST VFO ALIGNMENT (Figure 5-8) (Sch. Figure 7-4)

Test Equipment:

Frequency counter (70 MHz)
RF Voltmeter

Switch Positions

Function Switch - Manual
1st VFO - not on 00 MHz

5.4.9.1 Procedure

(1) Disconnect connectors J111 and J112 on underside of receiver and measure the output from the 1st VFO with the RF voltmeter. This reading should be approximately 200 mv.

(2) Connect the counter to J111 and tune the first VFO to 1 MHz. The measured frequency should be 41.5 MHz. If this frequency is not obtained, adjust the MHz tuning knob on the front panel to produce the correct frequency. The coil L1 in the first VFO has been locked and should not be adjusted unless absolutely necessary.

(3) Tune the first VFO to 29 MHz and check that the measured frequency on the counter is 69.5 MHz.

(4) Adjust capacitor C3 if the measured frequency is incorrect.

(5) Repeat steps 3 and 4 until both ends of the frequency range are within ±50 kHz.

(6) Tune the 1st VFO through all the frequencies and record the frequencies measured on the counter. The frequencies should be within ±50 kHz of the desired frequency, i.e. 40.5 MHz plus the receiver dial frequency equals the frequency on the counter. If an error is found in the middle of the band, the individual blades on the variable capacitor C1 will have to be adjusted. When all frequencies are correct, the alignment of the first VFO is completed.

NOTE

The above procedure is accomplished while ensuring that the MHz numbers tuned are centered in the escutcheon window opening of the receiver.

5.4.10 2ND VFO ALIGNMENT (Figure 5-8) (Sch. Figure 7-9)

Test Equipment:

Frequency Counter
RF Voltmeter

Switch Positions

2nd VFO - Internal
Function Switch - Manual
Fine tune control in middle of range

5.4.10.1 Procedure

(1) Connect the RF voltmeter to the 2nd VFO output on rear panel. The output should be greater than 250 mv.

(2) Connect the counter to the 2nd VFO output and set the 2nd VFO to 1000 kHz. The frequency measured on counter should be 3.6 MHz ±500 cycles.

(3) Set the 2nd VFO to 0 kHz and measure the frequency with the counter. The frequency should be 4.6 MHz, ±500 cycles. If the frequency is incorrect, adjust the trimmer capacitor C4 at the high end of the band.

(4) Return the 2nd VFO to 1000 kHz. Adjust mechanical coupling to C3 for the correct frequency. Repeat steps 3 and 4 until the correct frequency is obtained at both ends of the band. Do not adjust coil L1 as it has been locked in place an no adjustment of of this coil should be necessary.

(5) When both ends of the band are at the correct frequencies, tune the 2nd VFO to each 100 kHz point on the dial. The desired frequency is a multiple of 100 kHz at each 100 kHz point. If the observed frequency varies from desired frequency by more than 1 kHz, the individual blades on C3 may have to be adjusted. This should not be necessary in most cases.

(6) When all frequency points on the dial are correct, set the function switch to calibrate and check for a zero beat at all 100 kHz points on the dial. Also, tune the fine tune control and note that the frequency of the VFO varies approximately 8 kHz from one end of the fine tune control to the other.

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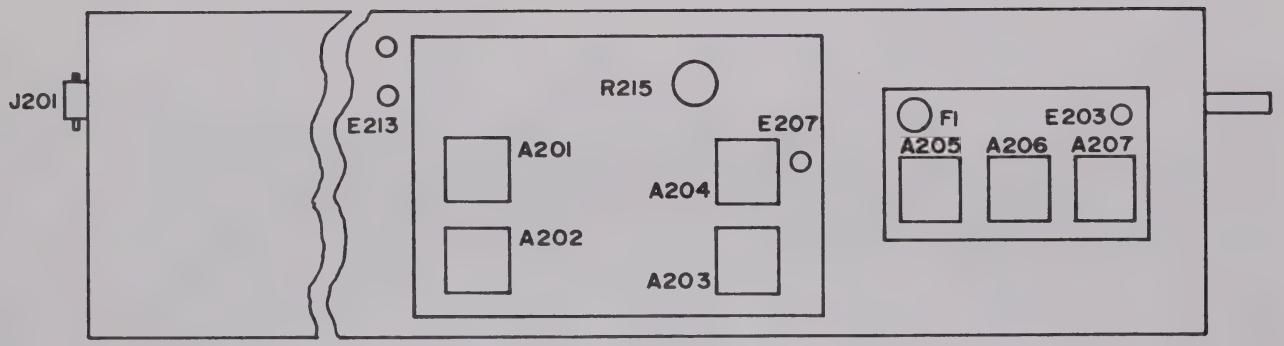
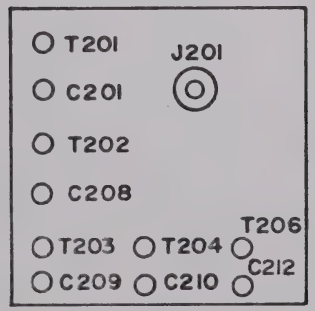




REAR VIEW

Figure 5-9. RF Unit Alignment (Parts Location)

5.4.11 RF UNIT ALIGNMENT (Figures 5-9, 7-2)

Test Equipment:

RF Voltmeter
Signal Generator
DC Voltmeter

Switch Positions:

Function Switch - Manual
1st VFO - not on 00 MHz
Antenna Range - Wideband
RF Attenuator - Minimum
IF Gain Control - Maximum (clockwise)

5.4.11.1 Procedure

(1) Connect the signal generator to the antenna input J201.

(2) Connect the RF voltmeter to terminal E203 on the 30 MHz low pass filter.

(3) Insure that-4 volts is present on AGC terminal E213.

(4) Set the signal generator for a 10 mv output at 37.5 MHz and adjust coils A205 and A207 for minimum on the RF voltmeter.

(5) Re-set the signal generator to 47.0 MHz and adjust coil A206 for a minimum on the RF voltmeter.

(6) Connect the RF voltmeter to terminal E207 and set the signal generator to 30 MHz.

(7) Adjust coils A201, A202, A203, and A204 for a maximum at 30 MHz, the output should be down 40 db at 40 MHz (at least).

(8) Tune the generator across the 1.0 to 30 MHz pass band and insure that the output measured on the RF voltmeter dos not vary more than 4 db.

(9) With the signal generator set at 5.5 MHz and an input level of 3 mv, the output at terminal E207 should be greater than 30 mv.

(10) Adjust the manual RF GAIN control on the front panel until -2 volts appears at terminal E213 (AGC bus).

(11) Adjust potentiometer R215 so that the output is 20 db down from the maximum gain condition (i.e. -4 volts AGC). Recheck that a change from -4 volts to -2 volts on the AGC produces a 20 db change in gain without adjustment of R215.

(12) Set the antenna range switch to the 1-2 MHz position.

(13) Re-set the RF GAIN to maximum (-4 volts).

(14) Set the signal generator for an output of 10 mv at 850 KHz.

(15) Remove the outer slug from transformer T201 and adjust the inner slug from the bottom of the coil to the first maximum on the RF voltmeter. Insure that the antenna tuning capacitor is set for maximum capacitance.

(16) Insert the outer slug and tune it for maximum output on RF meter.

(17) Re-set the generator to 2 MHz and adjust the antenna tuning control for maximum RF output.

(18) Adjust trimmer capacitor C207 for maximum RF output at 2MHz.

(19) Repeat this procedure (steps through 18) for the remaining ranges by adjusting the corresponding tuning slugs and capacitors listed below:

Range 2-4

T202 at 1.45 MHz
C208 at 4.0 MHz

Range 4-8

T203 at 2.8 MHz
C209 at 8.0 MHz

Range 8-16

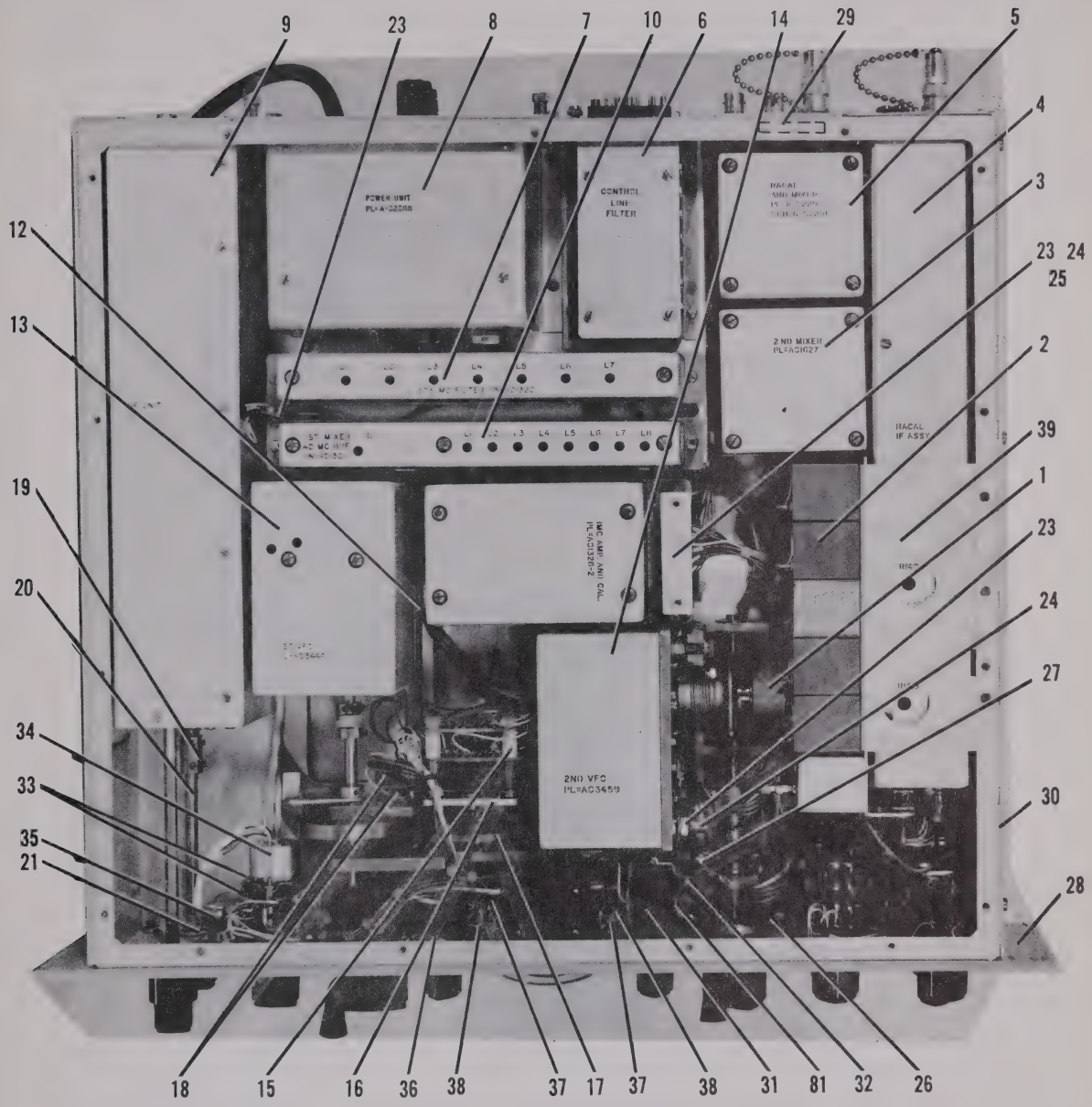
T204 at 6.5 MHz
C210 at 16.0 MHz

Range 16-30

T205 at 13.5 MHz
C212 at 30.0 MHz

This completes alignment of RF module.

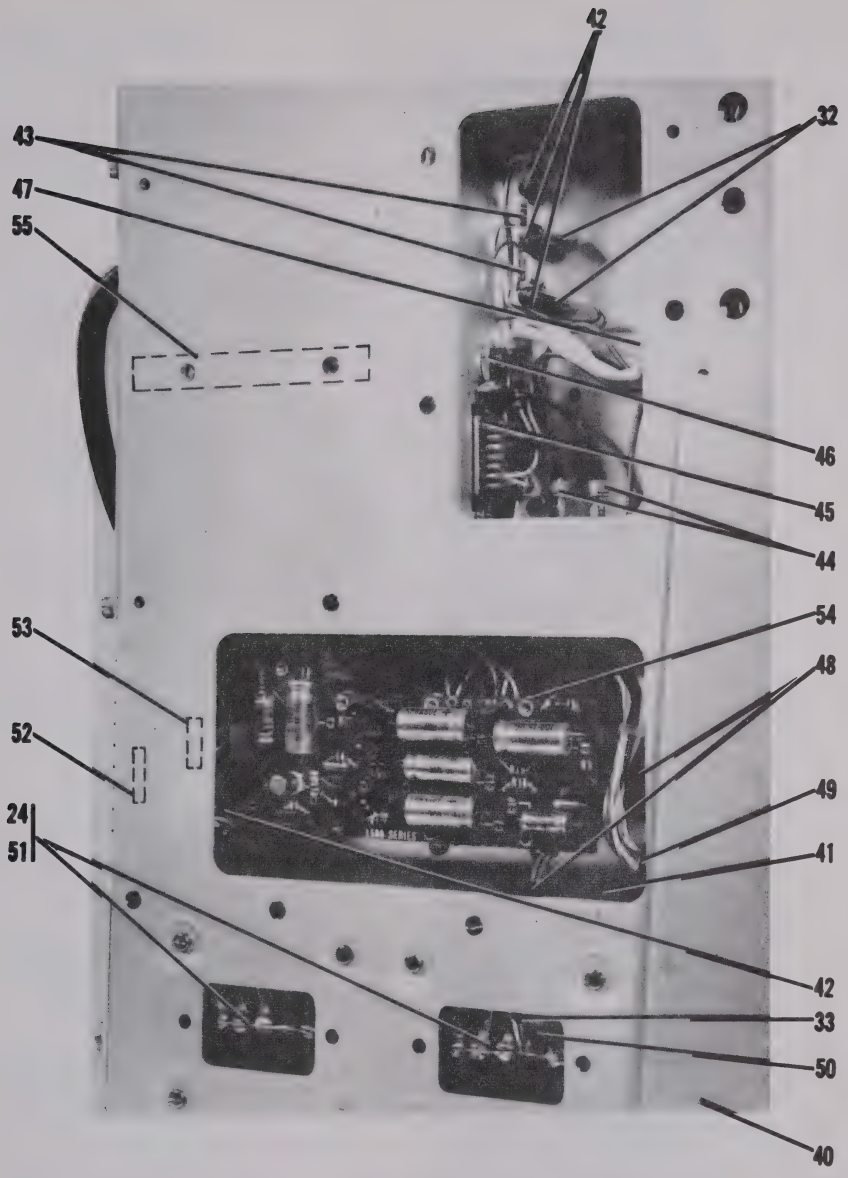
CHAPTER 6 - ILLUSTRATED PARTS IDENTIFICATION



(TOP VIEW)

(Schematic 7-1)

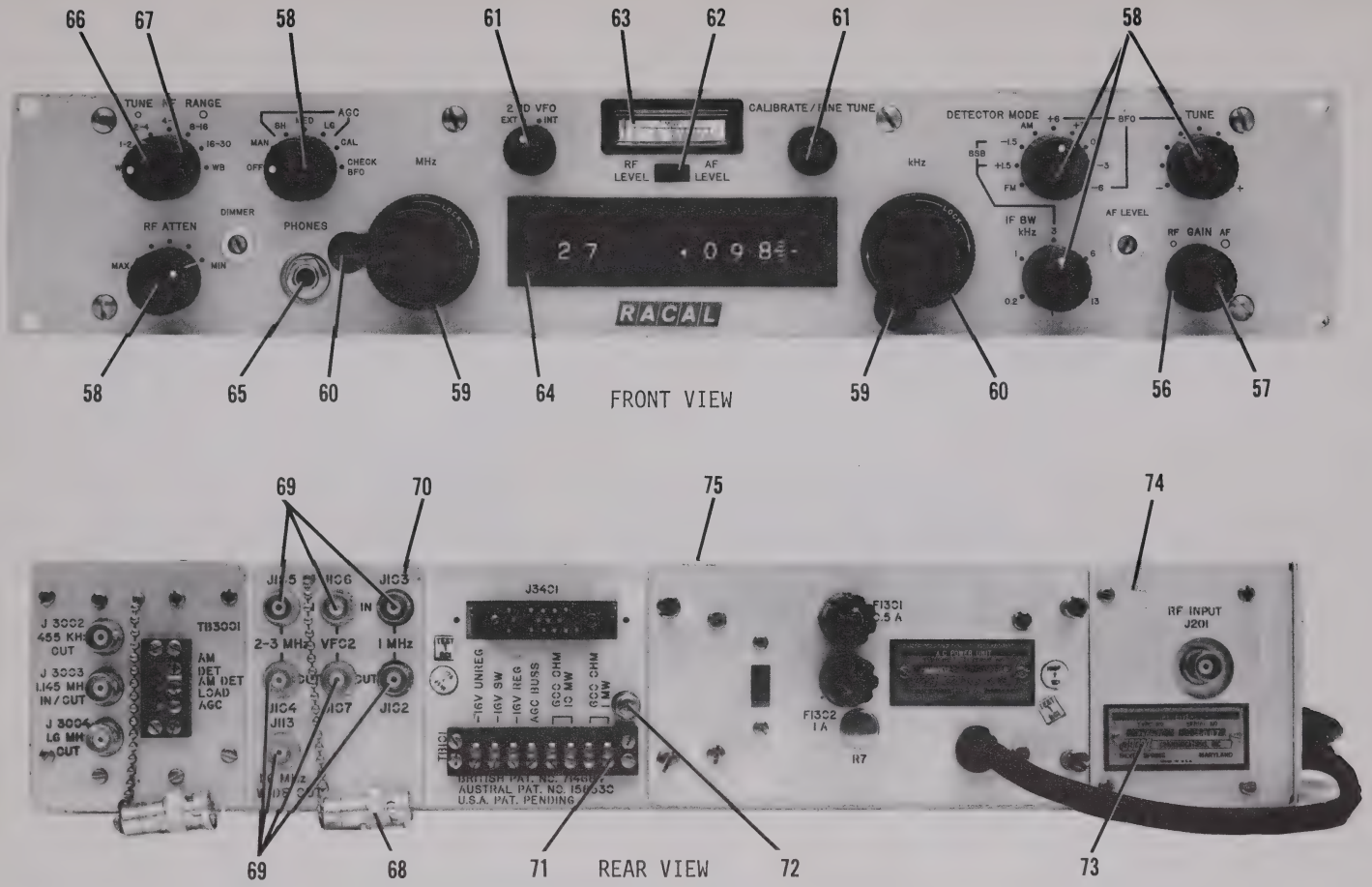
Figure 1. Radio Receiver RA6217 (Sheet 1 of 3)



Bottom View

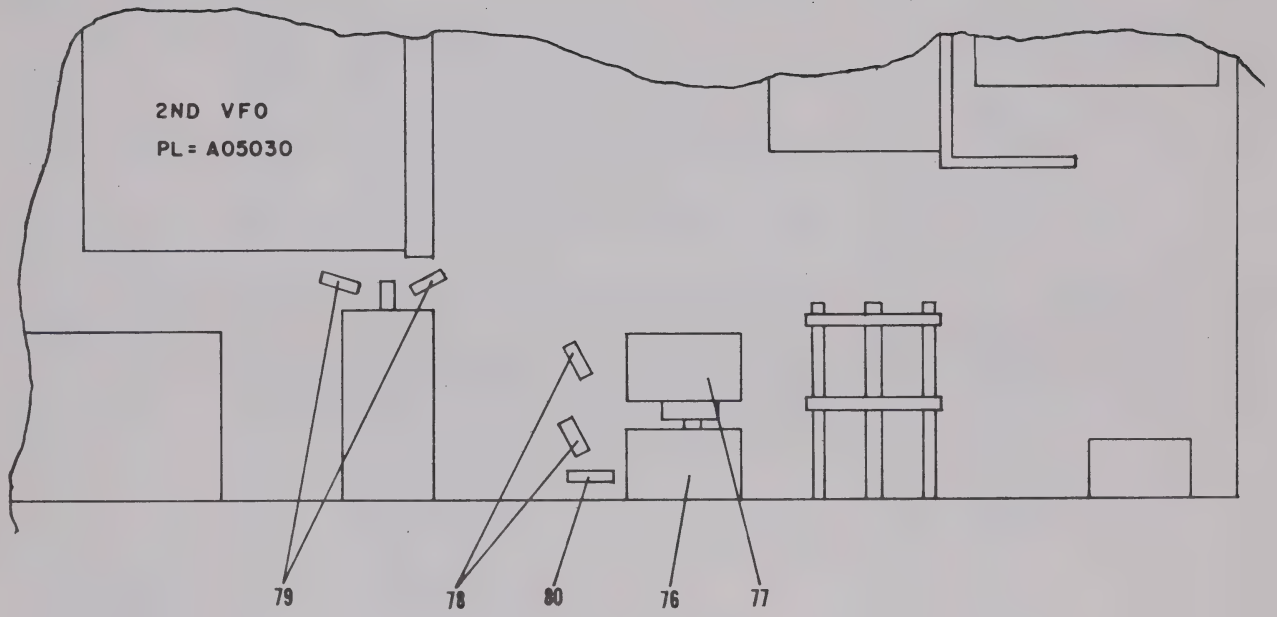
(Schematic 7-1)

Figure 1. Radio Receiver RA6217A-3 (Sheet 2 of 3)



(Schematic 7-1)

Figure 1. Radio Receiver RA6217A (Sheet 3 of 3)



Top Front View

(Schematic 7-1)

Figure 1. Radio Receiver RA6217A-3 (Sheet 3a of 3)

Fig. & Index No.	Part No. Mfg.	Part No. RCI	Description	Units Per Assy	Reference Designation
1-		A02086-3	RADIO RECEIVER RA6217A	1	(Sch., Figure 7-1)
		A04588	RADIO RECEIVER RA6217A-3	1	(Sch., Figure 7-1a)
1		A03995-1	GEAR TRAIN ASSEMBLY (For details, see fig. 48)	1	
2		A02087-1	CRYSTAL FILTER AND IF AMPLIFIER Assembly (For details, see fig. 34)	1	A110
3		A01627	SECOND MIXER AND 37.5-MHz AMPLIFIER ASSEMBLY (For details, see fig. 13)	1	A103
4		A02029-2	IF ASSEMBLY (For details, see fig. 39)	1	A111
5	Used RA6217A	A01323-1	THIRD MIXER ASSEMBLY (For details, see fig. 26)	1	A104
	Used RA6217A-3	A02290	THIRD MIXER ASSEMBLY (For details, see fig. 26)		
6	(Not Used)				
7		A01320	FILTER ASSEMBLY, 37.5-MHz (For details, see fig. 24)	1	A106
8		A02088	POWER UNIT ASSY MA6302 (For details, see fig. 32a)	1	A113
9		A02019-1	RF UNIT ASSEMBLY (For details, see fig. 2)	1	A101
			SCREW, FH (AP)	5	
10		A01321-1	FIRST MIXER AND 40-MHz FILTER ASSEMBLY (For details, see fig. 7)	1	A102
	MS35233-19		SCREW, PH (AP)	1	
	MS35338-78		WASHER, SPLIT, lock (AP)	2	
	MS35233-13		SCREW, PH (AP)	1	
		SP03-026	STANDOFF, 4-40, 15/16 in lg (AP)	1	
11	(Not Used)				
12		B03431	37.5-MHz GENERATOR-CALIBRATOR ASSEMBLY, (For details, see fig. 15)	1	A108, A109
13		A03446	OSCILLATOR ASSEMBLY, VARIABLE FREQUENCY FIRST (For details, see fig. 10)	1	A105
	MS35233-17		SCREW, PH (AP)	4	

Fig. & Index No.	Part No. Mfg.	Part No. RCI	Description	Units Per Assy	Reference Designation
	MS15795-304		WASHER, FLAT (AP)	4	
	MS35338-78		WASHER, SPLIT, LOCK (AP)	4	
1-14		A05030	OSCILLATOR ASSEMBLY, VARIABLE FREQUENCY, Second (For details, see fig. 29)	1	A107
		A03471	STANDOFF, 10-32 NF (AP)	3	
			NUT, 10-32 NF (AP)	3	
	MS15795-308		WASHER, FLAT (AP)	9	
	MS35338-81		WASHER, SPLIT, LOCK (AP)	3	
15	(Not Used)				
16		B03298	BRACKET, MOUNTING, SWITCH	1	
	MS35233-25		SCREW, PH (AP)	2	
17	G14-96		GEAR, SPUR (00141)	1	
18	UMIMAX-USMF		SWITCH, MICRO (80207)	2	S102, S103
	MS35233-10		SCREW, PH (AP)	2	
	MS35338-77		WASHER, SPLIT, LOCK (AP)	2	
19	138		COUPLING, SHAFT (83330)	1	
			SCREW, SET (AP)	2	
			SCREW, SET (AP)	2	
20		B03918	SHAFT, ATTENUATOR, ANTENNA	1	
	H16		CLIP, RETAINER, HAIRPIN TYPE (83723) (AP)	1	
21	2158		WASHER, FIBER SHOULDER (83330) (AP)	1	
22	2158		GROMMET, 1/8 in. i.d. (83330)	1	
23	DBMF-9W4S	60033	CONNECTOR, ELECTRICAL (71468)	2	J101, J110
24	DM53741-5000		CONNECTOR, COAXIAL, RIGHT ANGLE (71468)	15	
25		B02281	PLATE, HANDLE PLATE, CONNECTOR	1	
	MS35233-15		SCREW, PH (AP)	2	
	MS35338-78		WASHER, SPLIT, LOCK (AP)	2	
26	5/16-2		CLAMP, CABLE (95987)	2	
			SCREW, FH (AP)	2	
	MS15795-304		WASHER, FLAT (AP)	2	
	MS35338-78		WASHER, SPLIT, LOCK (AP)	2	
			NUT, 4-40 (AP)	2	
27	3/8-4		CLAMP, CABLE (95987)	1	
	MS35233-16		SCREW, PH (AP)	1	

Fig. & Index No.	Part No. Mfg.	Part No. RCI	Description	Units Per Assy	Reference Designation
	MS15795-304		WASHER, FLAT (AP)	1	
	MS35338-78		WASHER, SPLIT, LOCK (AP)	1	
1-28		C01728-2	PANEL, CHASSIS, FRONT	1	
			SCREW, OVAL HEAD (AP)	6	
29	RC07GF681J	10659	RESISTOR 680 ohm 1/4w 5%	1	R104
30		C01775	PLATE, SIDE	2	
	MS35233-30		SCREW, PH (AP)	12	
	8129		DIAL	1	
31		16027	RESISTOR, VARIABLE, 500-ohm, 2-watt	1	R103
32	5C023104X025 0B3	21760	CAPACITOR, FXD (56289) 0.1 uf, 25v	5	C101, C102, C106, C109, C112
33		21712	CAPACITOR, FXD (71590), .001uf, 1000v	3	C103, C104, C110
34	No Number		AGC ASSMEBLY (For details, see fig. 49)	1	
35		A03885	RESISTOR, VARIABLE, 1000-ohm, 2-watt	1	R106
36		51202	SWITCH, ROTARY (76854)	1	S101
37	336		LAMP, DIAL (92966)	2	DS101, DS102
38	25-12		HOLDER, LAMP, DIAL (95263)	2	
			SCREW, FH (AP)	2	
	9724-SS-0440-7		STANDOFF (06540) (AP)	2	
			NUT, 4-40 (AP)	2	
	MS35338-78		WASHER, SPLIT, LOCK (AP)	2	
39		C04992	PLATE, SUPPORT CHASSIS-REINFORCING	1	
			SCREW, FH (AP)	3	
40		C03897	PLATE, COVER BOTTOM	1	
			SCREW, PH (AP)	6	
41		D03896	PLATE, SUPPORT CHASSIS-REINFORCING	1	
			SCREW, FH (AP)	9	
42	2003-91-1		STANDOFF, TERMINAL, INSULATED (17117)	10	
			SCREW, FH (AP)	10	
43	RC07GF680J	10635	RESISTOR, FXD 68 ohm 1/4w 5%	2	R101, R102
44	UG-1463/U		CONNECTOR, ELECTRICAL (71468)	2	
45	DAMF-15P		CONNECTOR, ELECTRICAL (71468)	1	
	MS35233-4		SCREW, PH (AP)	2	
	MS35338-77		WASHER, SPLIT, LOCK (AP)	2	

Fig. & Index No.	Part No. Mfg.	Part No. RCI	Description	Units Per Assy	Reference Designation
	1488-4		LUG, SOLDER (83330) (AP)	2	
1-45	2117A		BUSHING, GUIDE PIN, POWER UNIT (12284)	1	
			NUT, 3/8-32 (AP)	1	
	MS35338-76		WASHER, LOCK, INTERNAL TOOTH (AP)	1	
47	WG-201		GROMMET, CATERPILLAR (95987)	ar	
48	MS35489-6		GROMMET, 1/4 in. i.d.	2	
49	2175		GROMMET, 3/8 in. i.d. (83330)	1	
50	CK60AW102M		CAPACITOR, FIXED	1	
51	DBMF-9W4S		CONNECTOR, ELECTRICAL (71785)	2	
	8107-SS-0256-7		STANDOFF, TAP (06540) (AP)	4	
	MS35249-11		SCREW, FH (AP)	4	
	MS35233-3		SCREW, PH (AP)	4	
	MS35338-77		WASHER, SPLIT, LOCK (AP)	4	
	1497		LUG, SOLDER (83330) (AP)	2	
52	RC07GF302J	10674	RESISTOR, FIXED COMP, 3K, 1/4w, 5%	1	R105
53	B/51		DIODE (88141)	1	CR101
54		D01502	CIRCUIT CARD ASSEMBLY, AUDIO AMPLIFIER (For details, see fig. 38)	1	A112
	MS35249-11		SCREW, FH (AP)	2	
	MS35233-4		SCREW, PH (AP)	2	
	MS35338-77		WASHER, SPLIT, LOCK (AP)	2	
55		A03380	FILLER STRIP	1	
			SCREW, FH (AP)	2	
56	90-1CB-4G		KNOB, CONCENTRIC (94144)	1	
57	70-1-3G		KNOB (94144)	1	
58		A03762	KNOB, CONTROL, 1/4 in. SHAFT	5	
59	KL-1251G		KNOB, LOCK (94144)	2	
		SP06-007	BUSHING, MOUNTING, LOCK-KNOB (AP)	2	
60		B02943	KNOB, CRANK, 1/4 in. SHAFT	2	
61	70-1WD-2G		KNOB (94144)	2	
62	399278-276		SWITCH, SLIDE, DPDT (76854)	1	
			SCREW, FH (AP)	2	
	MS35338-78		WASHER, SPLIT, LOCK (AP)	2	
			NUT, 4-40 (AP)	2	

Fig. & Index No.	Part No. Mfg.	Part No. RCI	Description	Units Per Assy	Reference Designation
1-63		B02545-1	METER, RF VOLTAGE, 1-milliwatt	1	
64		C02873	ESCUTCHEON, COUNTER	1	
	C12042-017		NUT, SPEED (78553) (AP)	2	
65	C11		JACK, TELEPHONE (82389)	1	
66		B02479	KNOB, 1/4 in. shaft	1	
67	70-1WD-1G		KNOB, CONCENTRIC (94144)	1	
68		B03290	CAP, TERMINATION, 75-ohm	1	
69	UG-1094/U		CONNECTOR (74868)	7	
	1497		LUG, SOLDER (83330) (AP)	5	
70		B03275	PLATE, MOUNTING, CONNECTOR	1	
71	8-172Y		BLOCK, TRRMINAL, 8-post (71785)	1	
	MS35233-17		SCREW, PH (AP)	4	
	MS35338-78		WASHER, SPLIT, LOCK (AP)	4	
72	MS35233-35		SCREW, PH (AP)	1	
	MS35649-64		NUT, 6-32 (AP)	2	
	MS1579-306		WASHER, FLAT (AP)	3	
	MS35338-79		WASHER, SPLIT, LOCK (AP)	1	
73		B04792-12	NAMEPLATE	1	
	"COMPL"		SCREW, PH (AP)	2	
74		B03338	PLATE, ACCESS, RF-STENCILED	1	
	MS35233-22		SCREW, PH (AP)	4	
	MS35338-78		WASHER, SPLIT, LOCK (AP)	4	
75		D01848-1	PLATE, COVER, TOP	1	
	MS35233-22		SCREW, PH (AP)	15	
	MS35338-78		WASHER, SPLIT, LOCK (AP)	15	
76	RA6217A-3	16056	POTENTIOMETER, 500, 1/2W, ±10%	1	R111A
77	RA6217A-3	16057	POTENTIOMETER, 500, 1/2W, ±10%	1	R111B
78	RA6217A-3	10663	RESISTOR, FIXED COMP., 1K, 1/4W, ±5%	2	R112, R113
79	RA6217A-3	10640	RESISTOR, FIXED COMP., 110, 1/4W, ±5%	2	R114, R115
80	RA6217A-3	10673	RESISTOR, FIXED COMP., 2.7K, 1/4W, ±5%	1	R116
81	RA6217	10673	RESISTOR, FIXED COMP., 2.7K, 1/4W, ±5%	1	R111

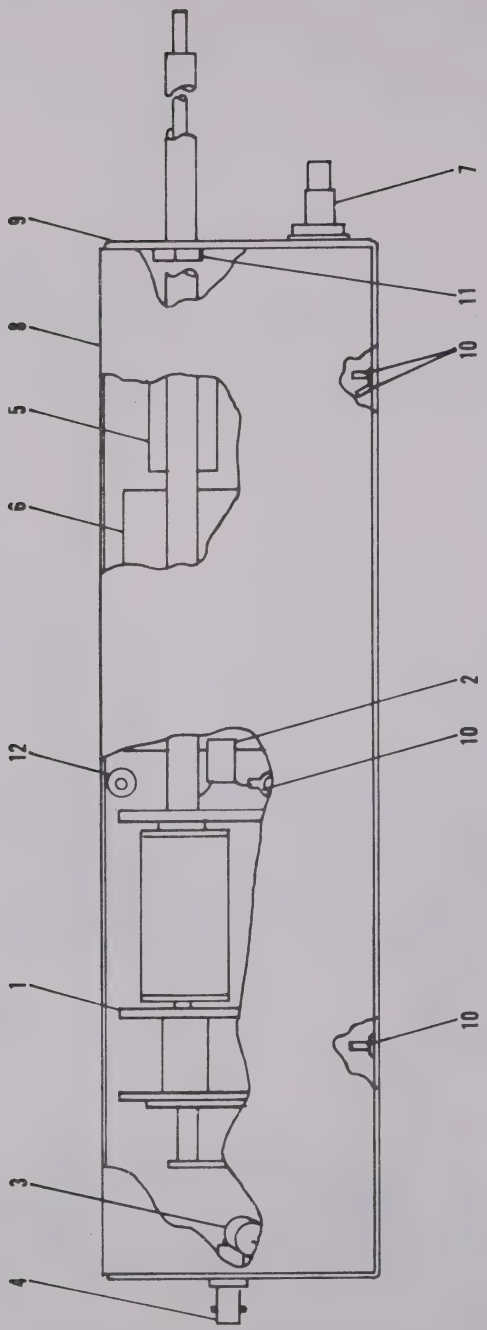


Figure 2. RF Unit Assembly

Fig. & Index No.	Part No. Mfg.	Part No. RCI	Description	Units Per Assy	Reference Designation
2-		A02019-1	RF UNIT ASSEMBLY (For NHA,* see fig. 1)	1	A101 (Sch., Figure 7-2)
1		A02591-1	ANTENNA TUNED CIRCUIT (For details, see fig. 3)	1	A208
			SCREW, FH (AP)	4	
2		21706	CAPACITOR, FXD CERAMIC, .1uf, 20%, 25V	1	C227
3		64001	ARRESTOR, ELECTRICAL SURGE	1	E201
4		60002	CONNECTOR, RF, COAXIAL, UG-1094/U	1	J201
5		A02589	CIRCUIT CARD ASSY, ANTENNA 30 MHz LOWPASS FILTER (For details, see fig. 4)	1	TB201
	MS35249-9		SCREW, FH (AP)	2	
6		A02590-1	CIRCUIT CARD ASSY, RF AMPLIFIER (For details, see fig. 5)	1	TB204
	MS35233-13		SCREW, PH (AP)	4	
	MS35338-78		WASHER, SPLIT, LOCK (AP)	4	
	MS15795-303		WASHER, FLAT (AP)	4	
7		A02841-1	SWITCH ASSY, RF ATTENUATOR (For details, see fig. 6)	1	S201
8		B02505	COVER, RF UNIT	1	
	MS35233-13		SCREW, PH (AP)	10	
	MS35338-78		WASHER, SPLIT, LOCK (AP)	10	
9		C02020	CHASSIS, RF UNIT	1	
10	1488-4		LUG, SOLDER TERMINAL (83330)	4	
			SCREW, FH (AP)	3	
			NUT, 4-40 (AP)	3	
	MS35338-78		WASHER, SPLIT, LOCK (AP)	3	
11		B02386	CONTACT STRIP, RF GROUNDING	1	
	MS35233-13		SCREW, PH (AP)	2	
	MS35338-78		WASHER, SPLIT, LOCK (AP)	2	
		B02387	BLOCK, MOUNTING, GROUNDING STRIP (AP)	1	
12	2185		GROMMET, RUBBER (83330)	1	
			NOTE MIL STD 12,B defines NHA as Next Higher Assembly		

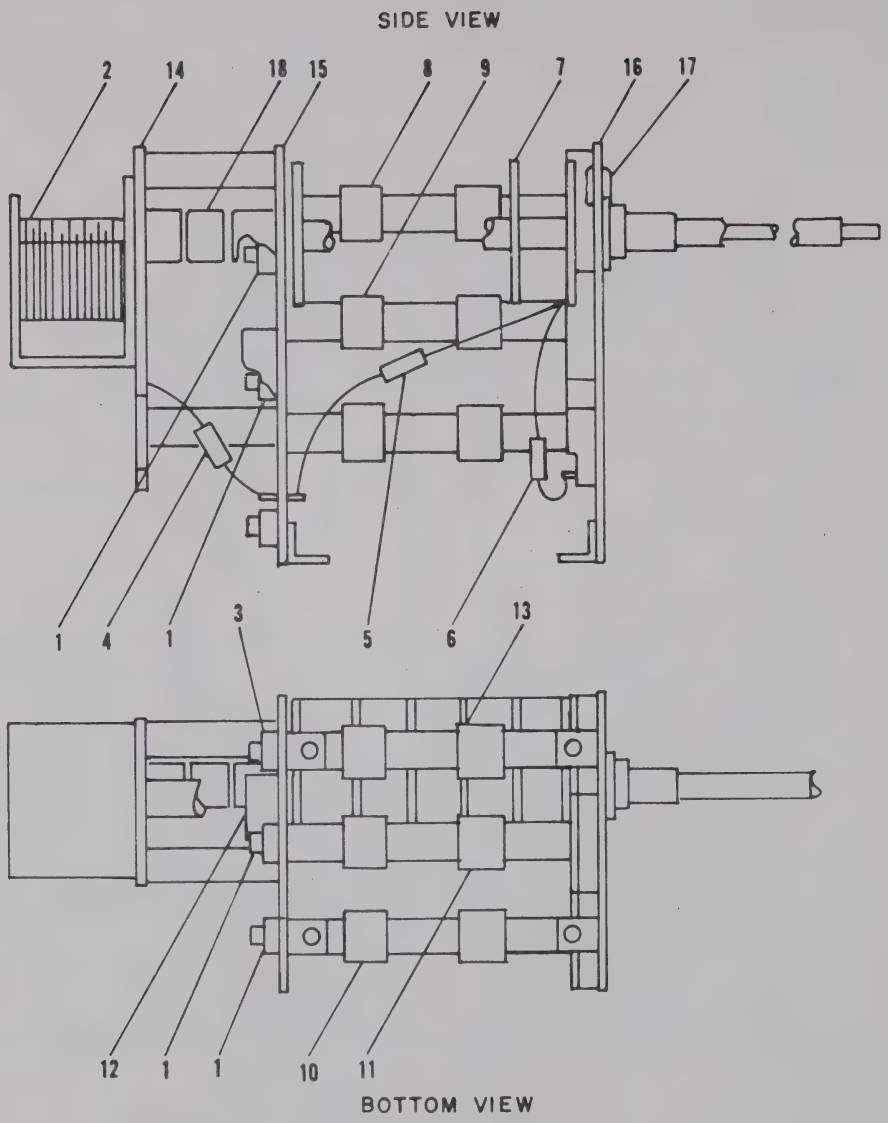


Figure 3. Antenna Tuned Circuit

Fig. & Index No.	Part No. Mfg.	Part No. RCI	Description	Units Per Assy	Reference Designation
3-		A02591-1	ANTENNA TUNED CIRCUIT (For NHA, see fig. 2)	1	A208 (Sch., Figure 7-2)
1		28019	CAPACITOR, VARIABLE CERAMIC DIELECTRIC 3.5-13 pf, 7S TRIKO, 02 TEMP. COEF. (Steatite Insulation Ltd., 31 George St., Lozella, Birmingham 19, England)	4	C207, C208, C209, C210
2		B02023	CAPACITOR, VARIABLE, AIR, 8.5 - 167pf	1	C211,(C228 part of C211 A & B assembly)
	MS35233-26		SCREW, PH (AP)	3	
	MS35338-79		WASHER, SPLIT LOCK (AP)	3	
	MS15795-305		WASHER, FLAT (AP)	3	
3		28021	CAPACITOR, VARIABLE, CERAMIC DIELECTRIC 7-35 pf, 7S TRIKO, 02 TEMP. COEF. (Steatite Insulation Ltd., 31 George St., Lozella, Birmingham 19, England)	1	C212
4		26803	CAPACITOR, FXD, POLYSTYRENE, 15 pf ±1 pf, 125V	1	C229
5		43016	COIL, RF	1	L201
6		10655	RESISTOR, FIXED COMP., 470, 1/4, ±5%		R210
7		C01615-1	SWITCH, ROTARY, 7-position, RF range	1	S202A, B, C, D
8		D02828	TRANSFORMER, RF, 1-2 MHz	1	T201
	MS35233-13		SCREW, PH (AP)	2	
	MS35338-78		WASHER, SPLIT, LOCK (AP)	2	
9		D02827	TRANSFORMER, RF, 2-4 MHz	1	T202
	MS35233-13		SCREW, PH (AP)	2	
	MS35338-78		WASHER, SPLIT, LOCK (AP)	2	
10		D02826	TRANSFORMER, RF, 4-8 MHz	1	T203
	MS35233-13		SCREW, PH (AP)	2	
	MS35338-78		WASHER, SPLIT LOCK (AP)	2	
11		D02825	TRANSFORMER, RF, 8-16 MHz	1	T204
	MS35233-13		SCREW, PH (AP)	2	
	MS35338-78		WASHER, SPLIT, LOCK (AP)	2	
12		D02961	TRANSFORMER, RF, WIDEBAND	1	T205
13		D02824	TRANSFORMER, RF, 16-30 MHz	1	T206
	MS35233-13		SCREW, PH (AP)	2	
	MS35338-78		WASHER, SPLIT, LOCK (AP)	2	

Fig. & Index No.	Part No. Mfg.	Part No. RCI	Description	Units Per Assy	Reference Designation
3-14		B01618	BRACKET, CAPACITOR MOUNTING	1	
	MS35233-25		SCREW, PH (AP)	3	
	MS35338-79		WASHER, SPLIT LOCK (AP)	3	
	MS15795-305		WASHER, FLAT (AP)	3	
15		C01780	BOARD, COIL SUPPORT ASSY, NO. 1	1	
16		B01781	BOARD, COIL SUPPORT ASSY, NO. 2	1	
17	2185		GROMMET, RUBBER (83330)	1	
18	A-201-35		COUPLING, FLEXIBLE (99934)	1	
			SCREW, SET (AP)	4	

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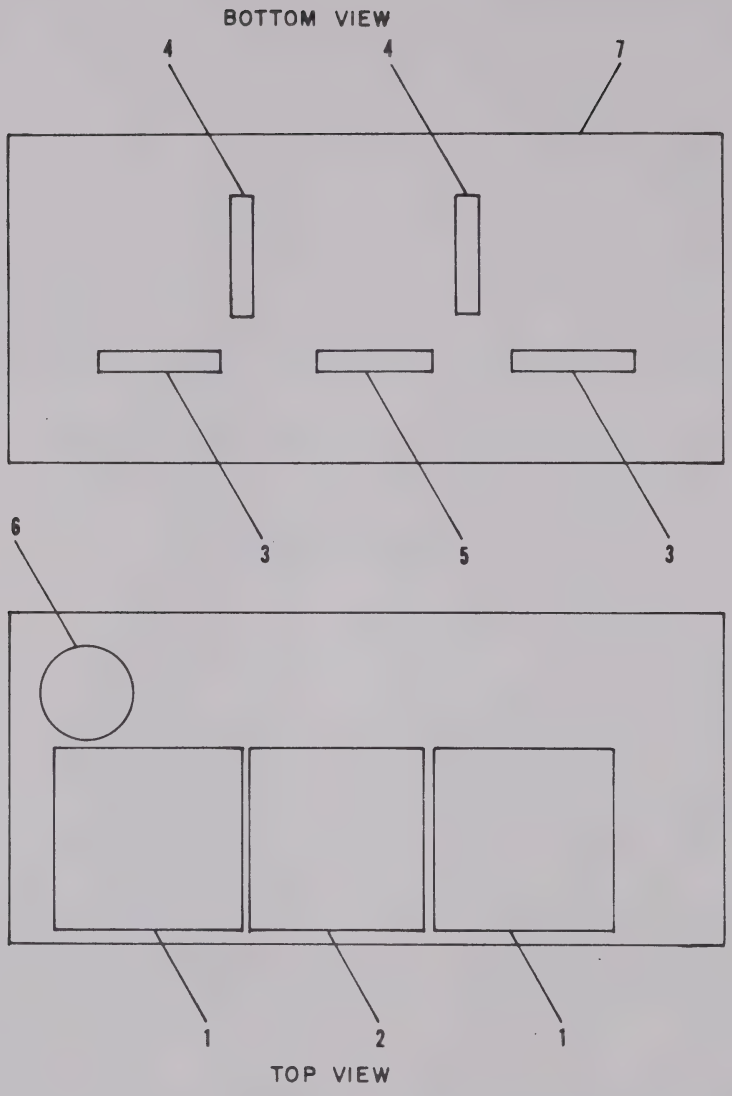


Figure 4. Circuit Card Assembly

Antenna 30 MHz Low Pass Filter

TB201

Fig. & Index No.	Part No. Mfg.	Part No. RCI	Description	Units Per Assy	Reference Designation
4-		A02589	CIRCUIT CARD ASSY, LOWPASS FILTER, 30-MHz, ANTENNA (For NHA, see fig. 2)	1	TB201 (Sch. Figure 7-2)
1		D02959	COIL ASSY, RF, TUNEABLE	2	A205, A207
2		D02960	COIL ASSY, RF, TUNEABLE	1	A206
3		22318	CAPACITOR, FXD, MICA, 68pf, ±5%. 500V (14655)	2	C201, C206
4		22320	CAPACITOR, FXD, MICA, 82pf, ±5%, 300V (14655)	2	C202, C205
5		22305	CAPACITOR, FXD, MICA, 20pf, ±5% 500V (14655)	1	C203
6		40006	FUSE, ULTRAFAST, 125V, 1/2 amp. (75915)	1	F201
7		C01752	PRINTED WIRING BOARD	1	

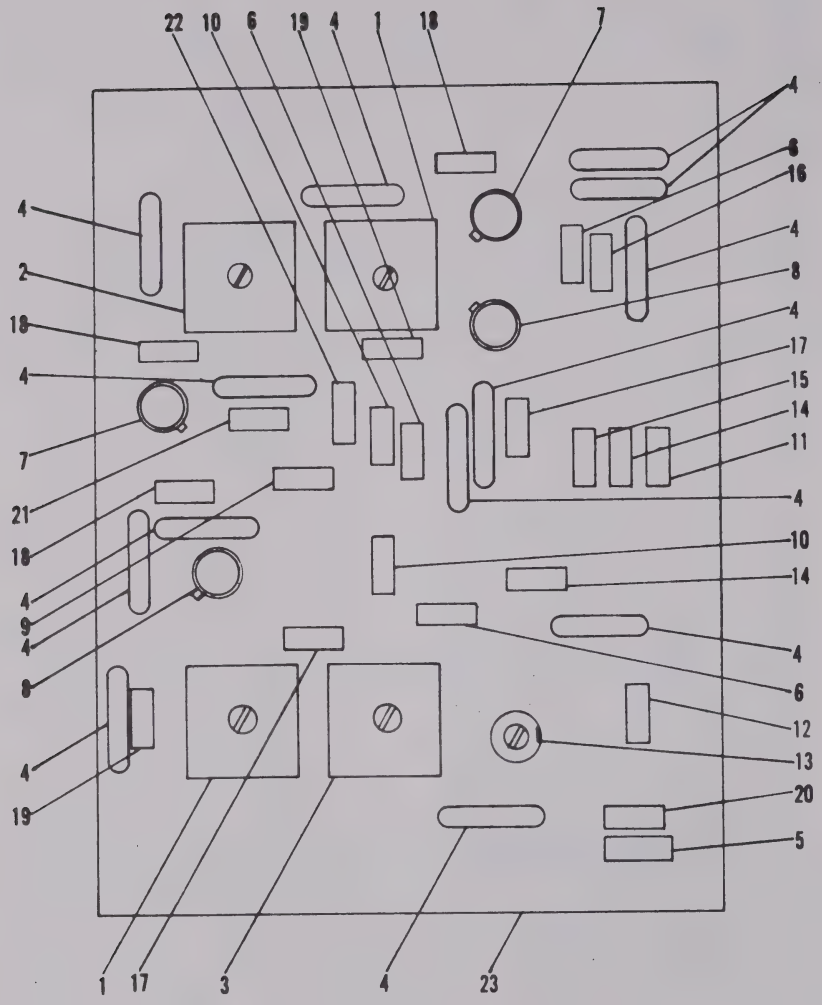


Figure 5. Circuit Card Assembly
RF Amplifier TB204

Fig. & Index No.	Part No. Mfg.	Part No. RCI	Description	Units Per Assy	Reference Designation
5-		A02590-1	CIRCUIT CARD ASSY, RF AMPLIFIER For NHA, see fig. 2)	1	TB204 (Sch. Figure 7-2)
1		D01366	COIL, RF	2	A201, A203
2		D01367	COIL, RF	1	A202
3		D03041	COIL, RF	1	A204
4		21706	CAPACITOR, FXD, CERAMIC, 0.1uf, ±20% 25V	13	C213 thru C221, C223 thru C226
5		25003	CAPACITOR, FXD, TANTALUM, 0.47uf, 35V	1	C222
6		35508	DIODE, 1N281	3	CR201, CR202*, CR203---CR204*
7		30252	TRANSISTOR, 2N2996	2	Q201, Q203
		70752	INSULATOR, DISC	2	
8		30253	TRANSISTOR, 2N964	2	Q202, Q204
		70752	INSULATOR, DISC	2	
9		10673	RESISTOR, 2.7K, 1/4W, 5%, RC07GF272J	1	R211
10		10647	RESISTOR, 220 ohm, 1/4W, 5%, RC07GF221J	2	R212, R223
11		10679	RESISTOR, 4.7K, 1/4W, 5%, RC07GF472J	1	R213
12		10661	RESISTOR, 820 ohm, 1/4W, 5%, RC07GF821J	1	R214
13		16025	RESISTOR, VARIABLE, 500-ohm	1	R215
14		10639	RESISTOR, 100 ohm, 1/4W, 5%, RC07GF101J	2	R216, R222
15		10669	RESISTOR, 1.8K, 1/4W 5%, RC07GF182J	1	R217
16		10671	RESISTOR, 2.2K, 1/4W 5%, RC07GF222J	1	R218
17		10625	RESISTOR, 27 ohm, 1/4W, 5%, RC07GF270J	2	R219, R227
18		10643	RESISTOR, 150 ohm, 1/4W 5%, RC07GF151J	3	R220, R225, R229
19		10659	RESISTOR, 680 ohm, 1/4W, 5% RC07GF681J	2	R221, R228
20		10667	RESISTOR, 1.5K, 1/4W 5%, RC07GF152J	1	R224
21		10665	RESISTOR, 1.2K, 1/4W 5%, RC07GF122J	1	R226
22	SZ3.6A	33528	DIODE, ZENER, 3.6V, 1 watt	1	VR201
23		D02917	PRINTED WIRING BOARD	1	
		NOTE:	Figure 7-2a (G02022E) is reflected in this parts list. The modification to 7-2b (G02022F) provides better protection from destructive high voltage transients and consists of adding back to back diodes CR202 and CR204, 1N916 (RCI 35514) to the RF input. The former CR202 1N281 RCI 35508 has been removed.		

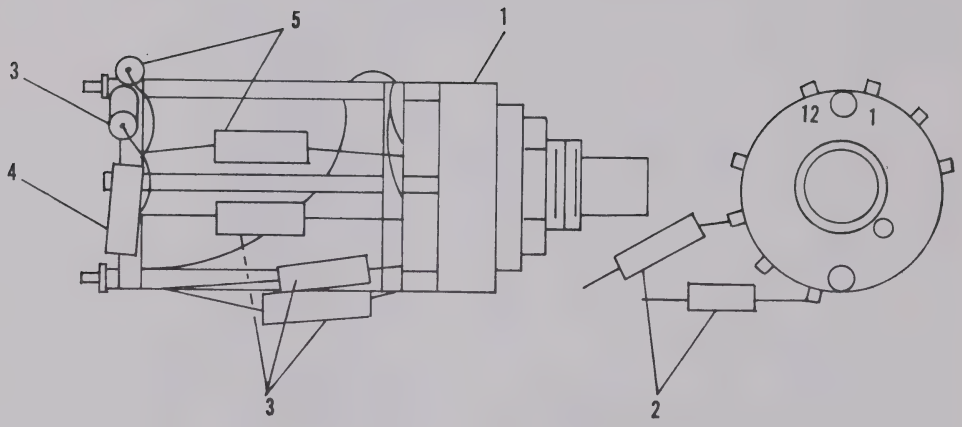


Figure 6. Switch Assembly, RF Attenuator

Fig. & Index No.	Part No. Mfg.	Part No. RCI	Description	Units Per Assy	Reference Designation
6-		A02841-1	SWITCH ASSY, RF ATTENUATOR (For NHA, see fig. 2)	1	(Sch. Figure 7-2)
1		C01273	SWITCH, ROTARY	1	S201
	MS35335-63		WASHER, LOCK, INTERNAL TOOTH (AP)	1	
	9002-NP		LOCKNUT, HEXAGON (73734) (AP)	1	
	A131023-1		LUG, SOLDER TERMINAL (76055) (AP)	1	
2	RC07GF150J	10619	RESISTOR, FIXED COMP., 15, 1/4W, ± 5%	2	R201, R209
3	RC07GF560J	10633	RESISTOR, FIXED COMP., 56, 1/4W, ± 5%	4	R202, R203, R207 R208
4	RC07GF470J	10631	RESISTOR, FIXED COMP., 47,1/4W, ± 5%	1	R204
5	RC07GF330J	10627	RESISTOR, FIXED COMP., 33, 1/4W, ± 5%	2	R205, R206

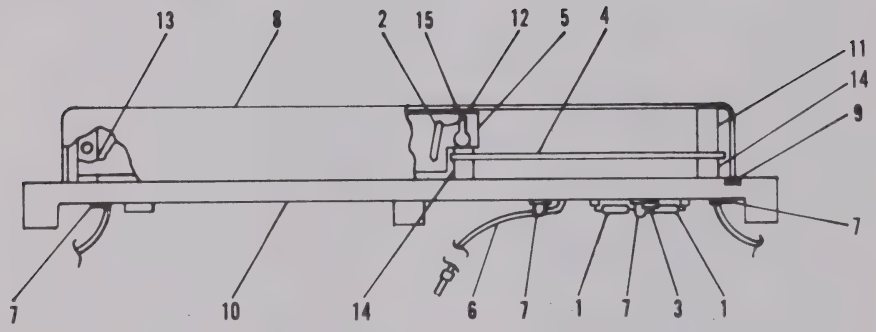
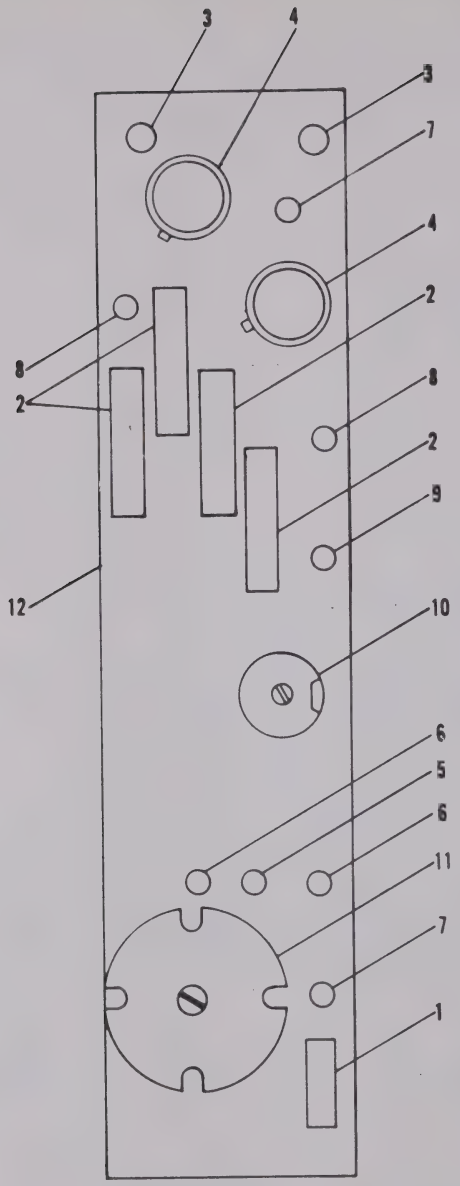


Figure 7. First Mixer and 40-MHz Filter Assembly

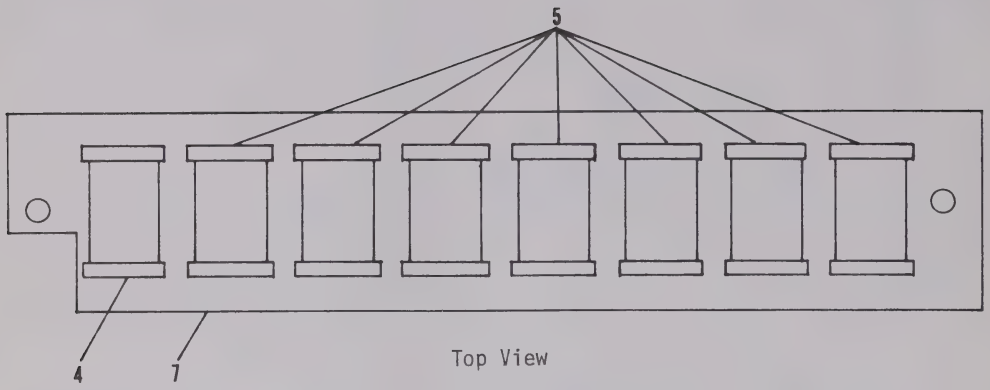
Fig. & Index No.	Part No. Mfg.	Part No. RCI	Description	Units Per Assy	Reference Designation
7-		A01321-1	FIRST MIXER AND 40-MHz FILTER ASSEMBLY (For NHA, see fig. 1)	1	A102 (Sch. Figure 7-3)
1	5C023104X0250B3	21706	CAPACITOR, FXD CERAMIC, .1uf 20%, 25V	2	C301, C302
2		21703	CAPACITOR, FXD, CERAMIC DISC, 1000pf, 1000V (71590)	1	C308
3		10633	RESISTOR, FIXED COMP., 56, 1/4W, ± 5%	1	R301
4		A02555	CIRCUIT CARD ASSY, FIRST MIXER (For details, see fig. 8)	1	TB301
	MS15795-304		WASHER, FLAT (AP)	1	
5		A02556-1	CIRCUIT CARD ASSY, 40-MHz FILTER (For details, see fig. 9)	1	TB302
	MS35233-3		SCREW, PH (AP)	2	
	5804-5-1		WASHER, (86928) (AP)	2	
6		D01974-1	CABLE ASSY, RF	1	
7	1488-4		LUG, SOLDER (83330)	4	
	MS35233-15		SCREW, PH (AP)	2	
	MS35338-78		WASHER, SPLIT, LOCK (AP)	2	
8		B02126	COVER, 1st MIXER AND 40-MHz FILTER	1	
	MS35233-13		SCREW, PH (AP)	3	
	MS35338-78		WASHER, SPLIT, LOCK (AP)	3	
	MS15795-304		WASHER, FLAT (AP)	3	
9	11-070		SHIELDING GASKET, ELECTRONIC KNITTED WIRE MESH (12881)	1	
10		C02123	BASE, CHASSIS	1	
11		SP01-022	SPACER (AP)	1	
12		B02127-2	SPACER (AP)	1	
13		B02127-1	SPACER (AP)	1	
	MS35233-15		SCREW, PH (AP)	1	
14		SP04-010	SPACER (AP)	2	
	MS35233-19		SCREW, PH (AP)	2	
	MS35338-78		WASHER, SPLIT, LOCK (AP)	2	
15	11A-093	70015	LUG, SOLDER (79963) (AP)	1	



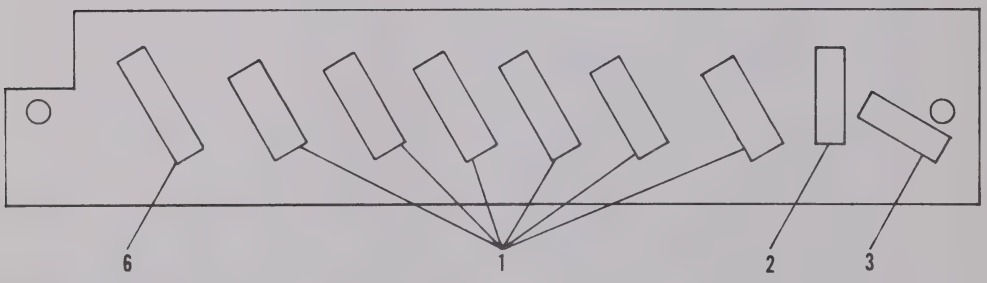
(Schematic 7-3)

Figure 8. Circuit Card Assembly, First Mixer
TB 301

Fig. & Index No.	Part No. Mfg.	Part No. RCI	Description	Units Per Assy	Reference Designation
8-		A02555	CIRCUIT CARD ASSY, FITST MIXER (For NHA, see fig. 7)	1	TB301 (Sch., Figure 7-3)
1		21703	CAPACITOR, FXD, CERAMIC, 1000pf 1000V	1	C303
2	5C023104X0250B3	21706	CAPACITOR, FXD. CERAMIC, .1uf, 20%, 25V	4	C304, C305, C306, C307
3		26808	CAPACITOR, FXD, POLYSTYRENE 39 pf, 125V	2	C309, C310
4	2N2996	30252	TRANSISTOR, PNP (01295)	2	Q301, Q302
	N88001	70752	INSULATOR, DISC (17069)	2	
5	RC07GF153J	10691	RESISTOR, FIXED COMP., 15K, 1/4, ± 5%	1	R303
6	RC07GF820J	10637	RESISTOR, FIXED COMP., 82, 1/4, ± 5%	2	R304, R305
7	RC07GF332J	10675	RESISTOR, FIXED COMP., 3.3K, 1/4, ± 5%	2	R306, R309
8	RC07GF560J	10633	RESISTOR, FIXED COMP., 56, 1/4, ± 5%	2	R307, R308
9	RC07GF222J	10671	RESISTOR, FIXED COMP., 2.2K, 1/4, ± 5%	1	R310
10	62PR2K	16019	RESISTOR, VARIABLE, 2K, 1/2W (0268T)	1	R311
11		D02935	TRANSFORMER, RF	1	T301
12		B01509	PRINTED WIRING BOARD	1	T301



Top View



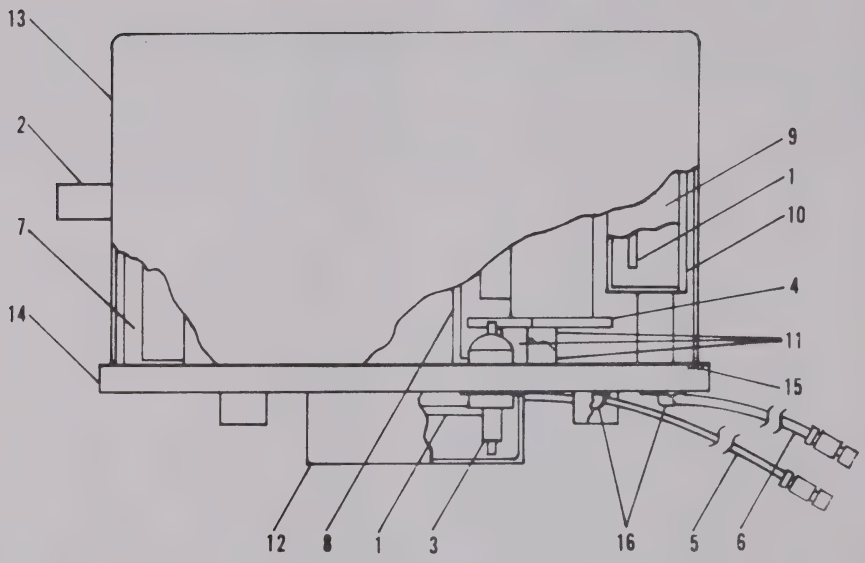
Bottom View

(Schematic 7-3)

Figure 9. Circuit Card Assembly, 40-MHz Filter

TB302

Fig. & Index No.	Part No. Mfg.	Part No. RCI	Description	Units Per Assy	Reference Designation
9-		A02556-1	CIRCUIT CARD ASSY, 40 MHz FILTER (For NHA, see fig. 7)	1	TB302 (Sch., Figure 7-3)
1		26809	CAPACITOR, FXD, POLYSTYRENE 47pf, ±2.5, 125V	6	C311 thru C316
2		26817	CAPACITOR, FXD, POLYSTYRENE, 220pf ± 5%, 33V	1	C318
3		26810	CAPACITOR, FXD, POLYSTYRENE, 56pf, ±2.5, 125V	1	C317
4		D02974	COIL ASSY, RF, TUNEABLE	1	L301
5		D02973	COIL ASSY, RF, TUNEABLE	7	L302 thru L308
6		10663	RESISTOR, FIXED COMP., 1K, 1/4, ± 5%	1	R312
7		B02121	PRINTED WIRING BOARD	1	



(Schematic 7-4)

Figure 10. OSCILLATOR, Variable Frequency, First A105

Fig. & Index No.	Part No. Mfg.	Part No. RCI	Description	Units Per Assy	Reference Designation
10-		A03446	OSCILLATOR, VARIABLE FREQUENCY, FIRST (For NHA, see fig. 1)	1	A105, (Sch. Figure 7-4)
1		A03309	CIRCUIT CARD ASSY, BUFFER AMPLIFIER (For details, see fig. 12)	2	A401, A402
		SP01-030	STANDOFF (AP)	4	
	MS35338-78		WASHER, SPLIT, LOCK	4	
	MS15795-303		WASHER, FLAT	4	
	MS35233-16		SCREW, PH (AP)	4	
			NUT	4	
			WASHER, SPRING	4	
2		C02409	CAPACITOR, VARIABLE, AIR DIELECTRIC	1	C401
			SCREW, FH (AP)	3	
3	3265-37-2	26401	CAPACITOR, FXD, CERAMIC, FEED THRU (71729), 1000pf, + 20%	1	C407
4		A02566	CIRCUIT CARD ASSY, OSCILLATOR VARIABLE FREQUENCY (For details, see fig. 12)	1	TB401
5		D01974-5	CABLE ASSY, RF	1	
6		D01974-6	CABLE ASSY, RF	1	
7		B03401	CASTING, BRACKET, CAPACITOR-MOUNTING	1	
	MS35233-28		SCREW, PH (AP)	3	
	MS35338-79		WASHER, SPLIT, LOCK (AP)	3	
8		B02174	PLATE, ELECTRICAL SHIELD	1	
	MS35233-13		SCREW, PH (AP)	2	
	MS35338-78		WASHER, SPLIT, LOCK (AP)	2	
9		B03450	CASE ASSY, BUFFER AMPLIFIER	1	
	MS35233-17		SCREW, PH (AP)	2	
	MS35338-78		WASHER, SPLIT, LOCK (AP)	2	
10		B03455	PLATE, COVER, BUFFER AMPLIFIER CASE	1	
	MS35233-13		SCREW, PH (AP)	2	
	MS35338-78		WASHER, SPLIT, LOCK (AP)	2	
	MS15795-303		WASHER, FLAT (AP)	2	
11		SP03-003	STANDOFF (AP)	3	
	MS35233-13		SCREW, PH (AP)	3	

Fig. & Index No.	Part No. Mfg.	Part No. RCI	Description	Units Per Assy	Reference Designation
10-11	MS35338-78		WASHER, SPLIT, LOCK (AP)	3	
	MS15795-303		WASHER, FLAT	1	
12		B03449	CASE, BUFFER AMPLIFIER	1	
	MS35233-13		SCREW, PH (AP)	2	
	MS35338-78		WASHER, SPLIT, LOCK (AP)	2	
13		B02176-2	COVER, CHASSIS BASE	1	
	MS35233-13		SCREW, PH (AP)	2	
	MS35338-78		WASHER, SPLIT, LOCK (AP)	2	
	MS17595-303		WASHER, FLAT (AP)	2	
14		C03448	BASE, CHASSIS, MACHINED CASTING	1	
15	11-070		SHIELDING GASKET, ELECTRONIC KNITTED WIRE MESH (12881)	1	
16	1488-4		LUG, SOLDER (83330)	2	
	MS35233-13		SCREW, PH (AP)	1	
	MS35338-78		WASHER, SPLIT, LOCK (AP)	1	

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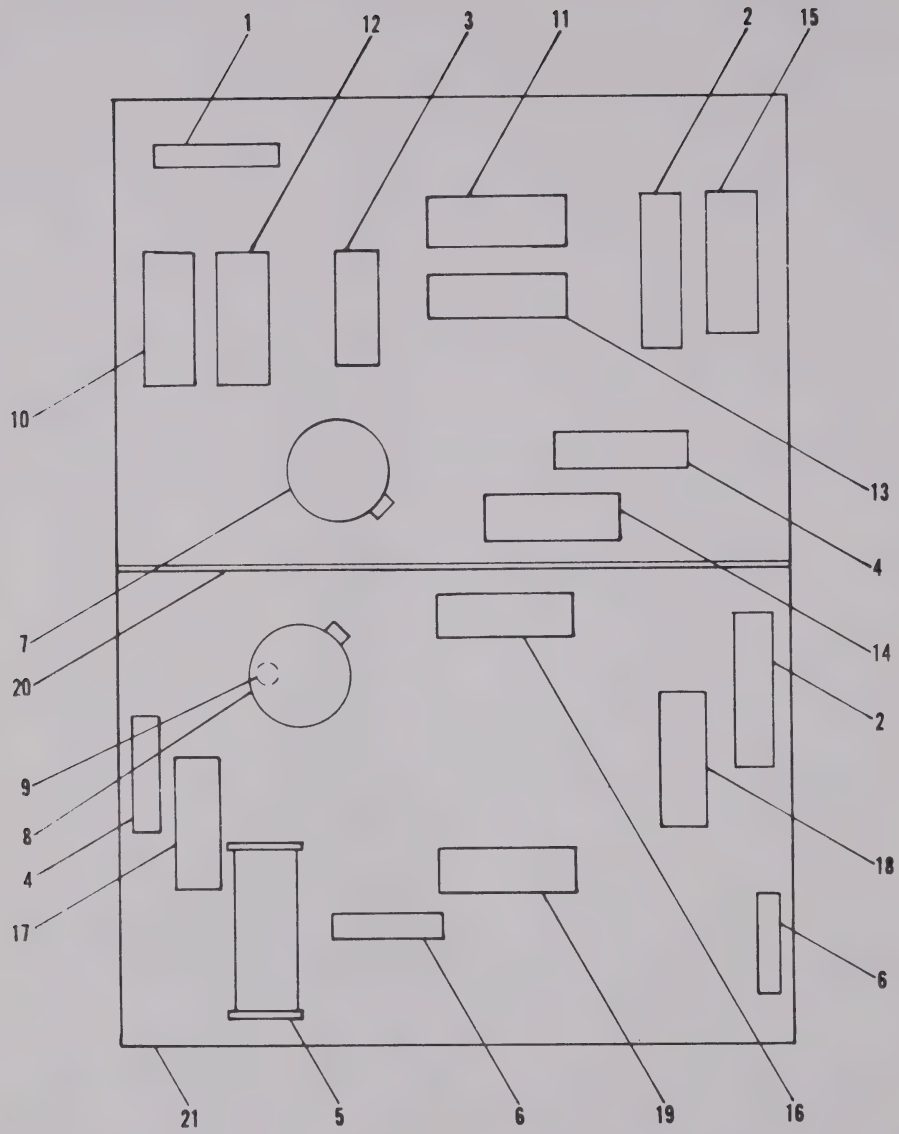
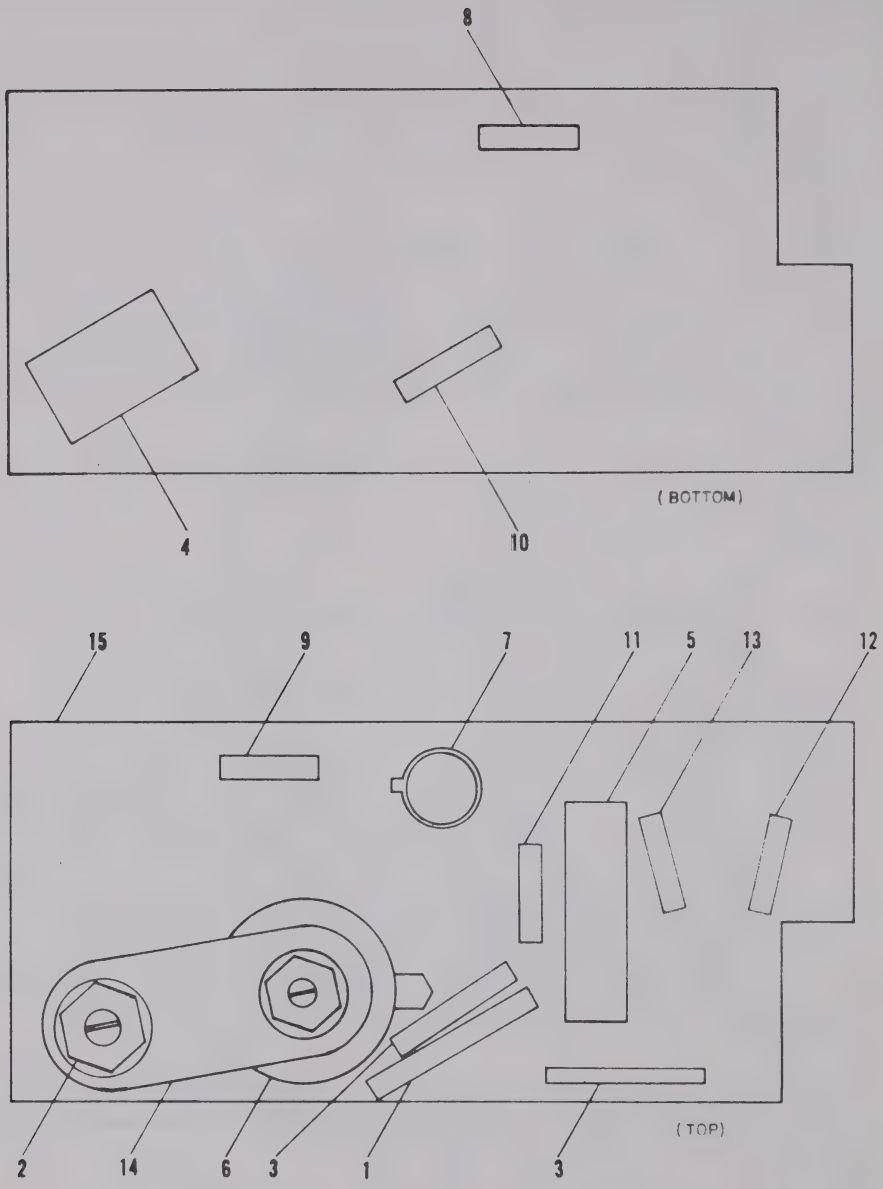


(Schematic 7-4)

Figure 11. Circuit Card Assembly, Buffer Amplifier

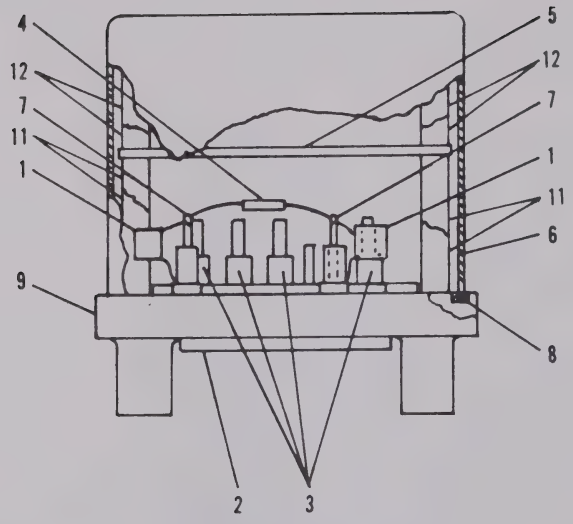
Fig. & Index No.	Part No. Mfg.	Part No. RCI	Description	Units Per Assy	Reference Designation
11-		A03309-1	CIRCUIT CARD ASSY, BUFFER AMPLIFIER (For NHA, see fig. 10)	2	A401, A402 (Sch., Figure 7-4)
1	CD6C470J500	22314	CAPACITOR, FXD, SILVER MICA, 47pf, ±5, 500 (14655)	1	C1, A401
2	C3023473X025	21719	CAPACITOR, FXD, CERAMIC, 0.047uf, ±20, 25V (56289)	2	C2, C5, A401
3	CD7F471J100	22338	CAPACITOR, FXD, SILVER MICA, 470pf, ± 5%, 100V (14655)	1	C3, A401
4	8121W5R533216	21723	CAPACITOR, FXD, CERAMIC DISC, 3300pf, + 10%, 50V (72982)	2	C4, C6, A401
5	3011000C0H0 689C	21321	CAPACITOR, FXD, CERAMIC, 6.8pf, .25, N750 (72982)	1	C7, A401
6	8121050WR102K	21718	CAPACITOR, FXD, CERAMIC DISC, 1000pf, + 10%, 50V (72982)	2	C8, C9, A401
7	2N3283	30500	TRANSISTOR (04713)	1	Q1, A401
	7717-46		INSULATOR, DISC (13103) (AP)	2	
8	2N2996	30252	TRANSISTOR (01295)	1	Q2, A401
	7717-46		INSULATOR, DISC (13103) (AP)	1	
9	5659065-3B	99971	FERRITE BEAD (02114)	1	E6, A401
10	RC07GF331J	10651	RESISTOR, FIXED COMP., 330, 1/4, 5%	1	R1, A401
11	RC07GF152J	10667	RESISTOR, FIXED COMP., 1.5K, 1/4, 5%	1	R2, A401
12	RC07GF882J	10685	RESISTOR, FIXED COMP., 8.2K, 1/4, 5%	1	R3, A401
13	RC07GF562J	10681	RESISTOR, FIXED COMP., 5.6K, 1/4, 5%	1	R4, A401
14	RC07GF681J	10659	RESISTOR, FIXED COMP. , 680, 1/4, 5%	1	R5, A401
15	RC07GF680J	10635	RESISTOR, FIXED COMP., 68, 1/4, 5%	1	R6, A401
16	RC07GF472J	10679	RESISTOR, FIXED COMP., 4.7K, 1/4, 5%	1	R7, A401
17	RC07GF103J	10687	RESISTOR, FIXED COMP., 10K, 1/4, 5%	1	R8, A401
18	RC07GF470J	10631	RESISTOR, FIXED COMP., 47, 1/4, 5%	1	R9, A401
19	RC07GF221J	10647	RESISTOR, FIXED COMP., 220, 1/4, 5%	1	R10, A401
20		B03131	PLATE, ELECTRICAL SHIELD	1	
21		C02249	PRINTED WIRING BOARD	1	



(Schematic 7-4)

Figure 12. Circuit Card Assembly, Oscillator, Variable
TB401

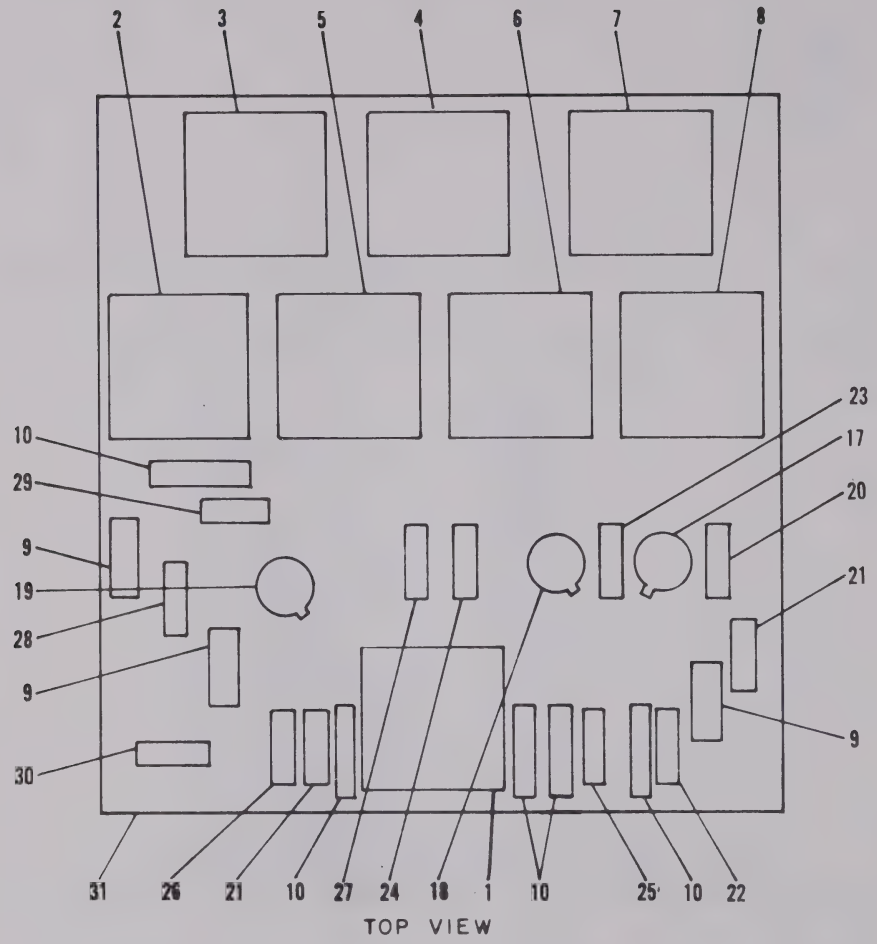
Fig. & Index No.	Part No. Mfg.	Part No. RCI	Description	Units Per Assy	Reference Designation
12-		A02566	CIRCUIT CARD ASSY, OSCILLATOR, VARIABLE Frequency (For NHA, see fig. 10)	1	TB401 (Sch., Figure 7-4)
1	3011000C0H0 689C	21321	CAPACITOR, FXD, CERAMIC, TUBULAR 6.8pf (72982) N750	1	C402
2	NVC 26G	29500	CAPACITOR, VARIABLE, TRIMMER, 0.8-13pf, 750V (73899)	1	C403
3	3C15	21719	CAPACITOR, FIXED, CERAMIC DISC, .047uf, +20, 25V (56289)	2	C404, C406
4	CD7F181J500	22328	CAPACITOR, FIXED, MICA 180pf, ± 5%, 500 (14655)	1	C405
5	CM06F152JN3	22053	CAPACITOR, FXD, MICA, 1500, 350V (14655)	1	C408
6		D02968	COIL ASSY, VARIABLE	1	L401
	1485-4		LUG, SOLDER (83330)	1	
7	2N2996	30252	TRANSISTOR, PNP (01295)	1	Q401
8	RC07GF101J	10639	RESISTOR, FIXED COMP.,100, 1/4, ± 5%	1	R401
9	RC07GF100J	10615	RESISTOR, FIXED COMP., 10, 1/4 ± 5%	1	R402
10	RC07GF472J	10679	RESISTOR, FIXED COMP., 4.7K, 1/4, ± 5%	1	R403
11	RC07GF682J	10683	RESISTOR, FIXED COMP., 6.8K, 1/4, ± 5%	1	R404
12	RC07GF680J	10635	RESISTOR, FIXED COMP., 68, 1/4, ± 5%	1	R405
13	RC07GF103J	10687	RESISTOR, FIXED COMP., 10K, 1/4, ± 5%	1	R406
14		B02177	BRACKET, MTG. CAPACITOR	1	
15		D02215	PRINTED WIRING BOARD	1	



(Schematic 7-8)

Figure 13. 2nd Mixer and 37.5-MHz Ampl. Assembly

Fig. & Index No.	Part No. Mfg.	Part No. RCI	Description	Units Per Assy	Reference Designation
13-		A01627	2ND MIXER AND 37.5-MHz AMPL. ASSY (For NHA, see fig. 1)	1	A103 (Sch. Figure 7-8)
1	5C023104X025 0B3	21706	CAPACITOR, FXD (56289) 0.1uf	2	C511, C512
2	DBMF9W4P326	60018	CONNECTOR, ELECTRICAL (71785)	1	P501
	MS35249-11		SCREW, FH (AP)	2	
	MS35338-77		WASHER, SPLIT, LOCK (AP)	2	
	MS35649-24		NUT (AP)	2	
3	DM53743-5000	60025	CONNECTOR, COAXIAL (71785)	4	
4	RC07GF560J	10633	RESISTOR, FIXED COMP., 56, 1/4, ± 5%	1	R512
5		A02562	CIRCUIT CARD ASSY, 2ND and 37.5 MHz AMPL. MIXER (For details, see fig. 14)	1	TB501
6		B02101	COVER	1	
	MS35233-13		SCREW, PH (AP)	4	
	MS35338-78		WASHER, SPLIT, LOCK (AP)	4	
	MS15795-304		WASHER, FLAT (AP)	4	
7	2003-91-1		STANDOFF, TERMINAL	2	
	MS35233-3		SCREW, PH (AP)	2	
	MS35338-77		WASHER, SPLIT, LOCK (AP)	2	
	1485-4		LUG, SOLDER (83330) (AP)	2	
8	11-070		SHIELD, TAPE, MESH (12881)	1	
9		C02099	BASE, CHASSIS	1	
10	9736-SS-0440		STANDOFF (06540)	4	
11	9735-SS-0440		STANDOFF (06540)		
	5804-8-1		WASHER, SPRING (86928) (AP)	4	



(Schematic 7-8)

Figure 14. Circuit Card Assembly, Second Mixer and 37.5-MHz Ampl.

TB501

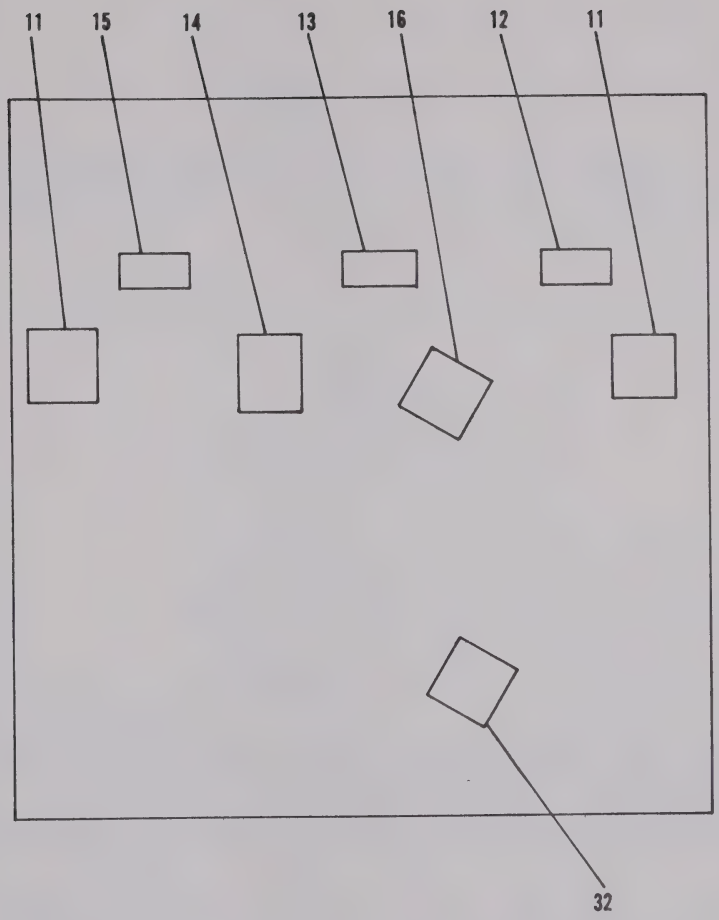


Figure 14. Circuit Card Assembly, Second Mixer and 37.5-MHz Ampl.

TB501

Fig. & Index No.	Part No. Mfg.	Part No. RCI	Description	Units Per Assy	Reference Designation
14-		A02562	CIRCUIT CARD ASSY, SECOND MIXER AND 37.5-MHz AMPL. (For NHA, see fig. 13)	1	TB501 (Sch. Figure 7-8)
1		D02981	COIL ASSY, RF	1	A501
2		D02975	COIL ASSY, RF	1	A502
3		D02976	COIL ASSY, RF	1	A503
4		D02977	COIL ASSY, RF	1	A504
5		D02830	COIL ASSY, RF	1	A505
6		D02978	COIL ASSY, RF	1	A506
7		D02979	COIL ASSY, RF	1	A507
8		D02980	COIL ASSY, RF	1	A508
9	DD-102G	21703	CAPACITOR, FXD, CERAMIC DISC, 1000 pf, ± 20, 1000 WVDC (71590)	3	C501, C509, C520
10	5815Y5U104M	21706	CAPACITOR, FXD, CERAMIC DISC, .1 uf, ± 20, 25V (72982)	6	C502, C503, C505, C506, C510
11	CD7F181J500	22359	CAPACITOR, FXD, SILVER MICA, 180 pf ± 2, 500 WVDC (14655)	2	C514, C522
12	CD6C470J500	22356	CAPACITOR, FXD, MICA, 47 pf, ± 2, 500WVDC (14655)	1	C516
13	CD6F101J300	22358	CAPACITOR, FXD, MICA, 100 pf, ± 2, 300V (14655)	1	C517
14	CD10C150J500	22355	CAPACITOR, FXD, MICA, 15 pf, ± 5, 50V (14655)	1	C518
15	CD6C560J500	22357	CAPACITOR, FXD, MICA, 56 pf, ± 2, 500 (14655)	1	C519
16	CD7F301J300	22360	CAPACITOR, FXD, SILVER MICA, 300 pf, ± 2 300 (14655)	1	C521
17	2N3283	30500	TRANSISTOR (04713)	1	Q501
	N88001		INSULATOR, DISC (17069) (AP)	1	
18	2N3323	30251	TRANSISTOR (01295)	1	Q502
	N88001		INSULATOR, DISC (17069) (AP)	1	
19	2N2996	30252	TRANSISTOR	1	Q503
	N88001		INSULATOR, DISC (17069) (AP)	1	
20	RC07GF273J	10697	RESISTOR, 27K, 1/4W, 5%	1	R501
21	RC07GF472J	10679	RESISTOR, 4.7K, 1/4W, 5%	2	R502, R507
22	RC07GF681J	10659	RESISTOR, 680, 1/4W, 5%	1	R503
23	RC07GF123J	10689	RESISTOR, 12K, 1/4W, 5%	1	R504

Fig. & Index No.	Part No. Mfg.	Part No. RCI	Description	Units Per Assy	Reference Designation
14-24	RC07GF222J	10671	RESISTOR, 2.2K, 1/4W, 5%	1	R505
25	RC07GF822J	10685	RESISTOR, 8.2K, 1/4W, 5%	1	R506
26	RC07GF392J	10677	RESISTOR, 3.9K, 1/4W, 5%	1	R508
27	RC07GF103J	10687	RESISTOR, 10K, 1/4W, 5%	1	R509
28	RC07GF471J	10655	RESISTOR, 470, 1/4W, 5%	1	R510
29	RC07GF271J	10649	RESISTOR, 270, 1/4W, 5%	1	R511
30	RC07GF101J	10639	RESISTOR, 100, 1/4W, 5%	1	R513
31		D01253	PRINTED WIRING BOARD	1	
32	CD6C050K500	22301	CAPACITOR, FXD, MICA 5 pf	1	C507

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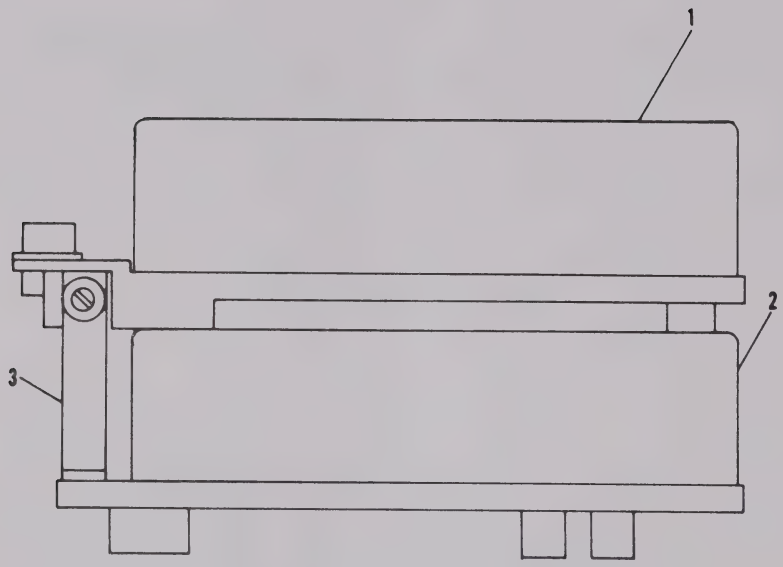
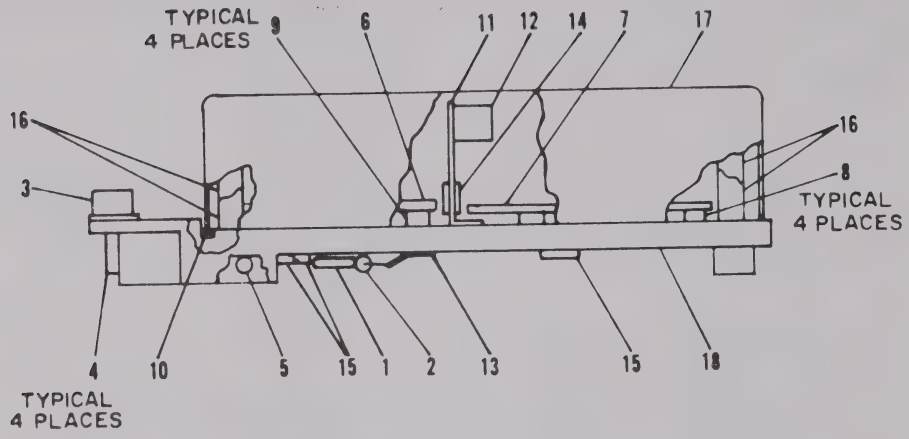


(Schematic 7-5 & 7-6)

Figure 15. GENERATOR-CALIBRATOR ASSY., 37.5-MHz

A108, A109

Fig. & Index No.	Part No. Mfg.	Part No. RCI	Description	Units Per Assy	Reference Designation
15-		B03431	GENERATOR-CALIBRATOR ASSY, 37.5-MHz (For NHA, see fig. 1)	1	A108, A109
1		A01326-2	AMPLIFIER-CALIBRATOR ASSY, 1-MHz (For details, see fig. 16)	1	A109 (Sch. Figure 7-5)
2		A01324-1	GENERATOR ASSY, 37.5-MHz (For NHA, see fig. 19)	1	A108 (Sch. Figure 7-6)
3		B02227	BRACKET HINGE	1	
	MS35233-13		SCREW, PH (AP)	2	
	MS35233-15		SCREW, PH (AP)	2	
	MS35338-78		WASHER, SPLIT, LOCK (AP)	4	
	MS15795-303		WASHER, FLAT (AP)	4	
			NUT (AP)	2	



(Schematic 7-5)

Figure 16. Amplifier-Calibrator, Assembly, 1-MHz

A109

Fig. & Index No.	Part No. Mfg.	Part No. RCI	Description	Units Per Assy	Reference Designation
16-		A01326-2	AMPLIFIER-CALIBRATOR, ASSY, 1 MHz (For NHA, see fig. 15)	1	A109 (Sch. Figure 7-5)
1	5815Y5U104M	21706	CAPACITOR, FXD, CERAMIC, 0.1uf, ± 20%	1	C629
2	K2R2J20KS	25002	CAPACITOR, FXD, TANTALUM 2.2uf, ± 10, 20, (05397)	1	C630
3	DBMF9W4P326	60033	CONNECTOR ASSY, ELECTRICAL (71785)	1	J601
	MS35233-4		SCREW, PH (AP)	2	
	MS35338-77		WASHER, SPLIT, LOCK (AP)	2	
4	DM53743-5000	60025	CONNECTOR, RF, COAXIAL, rt. ANGLED (71785)	4	
5	RC07GF390J	10629	RESISTOR, 39, 5%, 1/4W	1	R634
6		A02574	CIRCUIT CARD ASSY, 1 MHz AMPLIFIER (For details, see fig. 17)	1	TB601
7		A03407	CIRCUIT CARD ASSY, 1 MHz OSCILLATOR-CALIBRATOR (For details, see fig. 18)	1	TB602
8		SP03-021	STANDOFF (AP)	4	
	MS35233-2		SCREW, PH (AP)	4	
	5804-5-1		WASHER, SPRING (86928) (AP)	4	
9		SP03-011	STANDOFF (AP)	4	
	MS35233-2		SCREW (AP)	4	
	MS35338-78		WASHER, SPRING (AP)	4	
10	11-070		SHIELDING GASKET, ELECTRONIC, KNITTED WIRE MESH (12881) (AP)	1	
11		B02222	PLATE, ELECTRONIC SHIELD	1	
	MS35233-3		SCREW, PH (AP)	2	
	MS35338-77		WASHER, SPLIT, LOCK (AP)	2	
12	6156-1-C		CLIP, AUGAT (91506)	1	
	MS35233-13		SCREW, PH (AP)	1	
	MS35338-78		WASHER, SPLIT, LOCK (AP)	1	
	MS35649-44		NUT, (83330) (AP)	1	
13	1485-4		LUG, SOLDER (83330)	1	
	MS35233-13		SCREW, PH (AP)	1	
	MS35338-78		WASHER, SPLIT, LOCK (AP)	1	
14	2185		GROMMET (83330)	1	

Fig. & Index No.	Part No. Mfg.	Part No. RCI	Description	Units Per Assy	Reference Designation
16-15	MS35489-33		GROMMET	3	
16		SP03-006	STANDOFF	4	
17		B02223	COVER, CHASSIS	1	
	MS35233-12		SCREW, PH (AP)	4	
	MS35338-78		WASHER, SPLIT, LOCK (AP)	4	
	MS15795-304		WASHER, FLAT (AP)	4	
18		C02225	BASE	1	
	6234-SS-0440		SCREW, PH (06540) (AP)	4	

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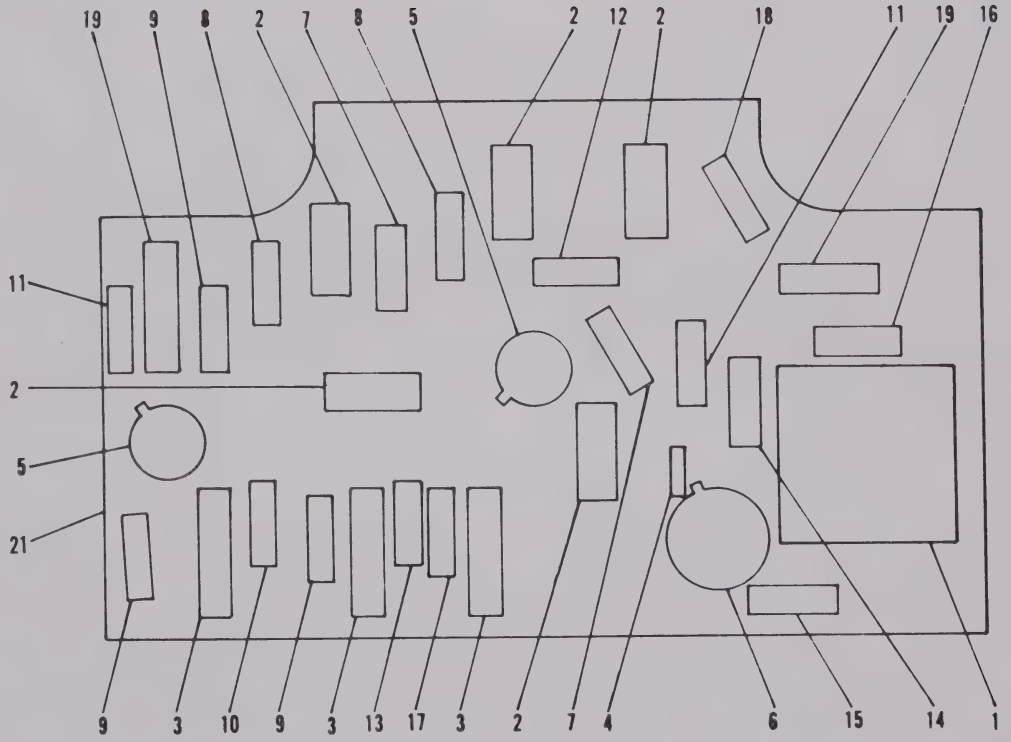
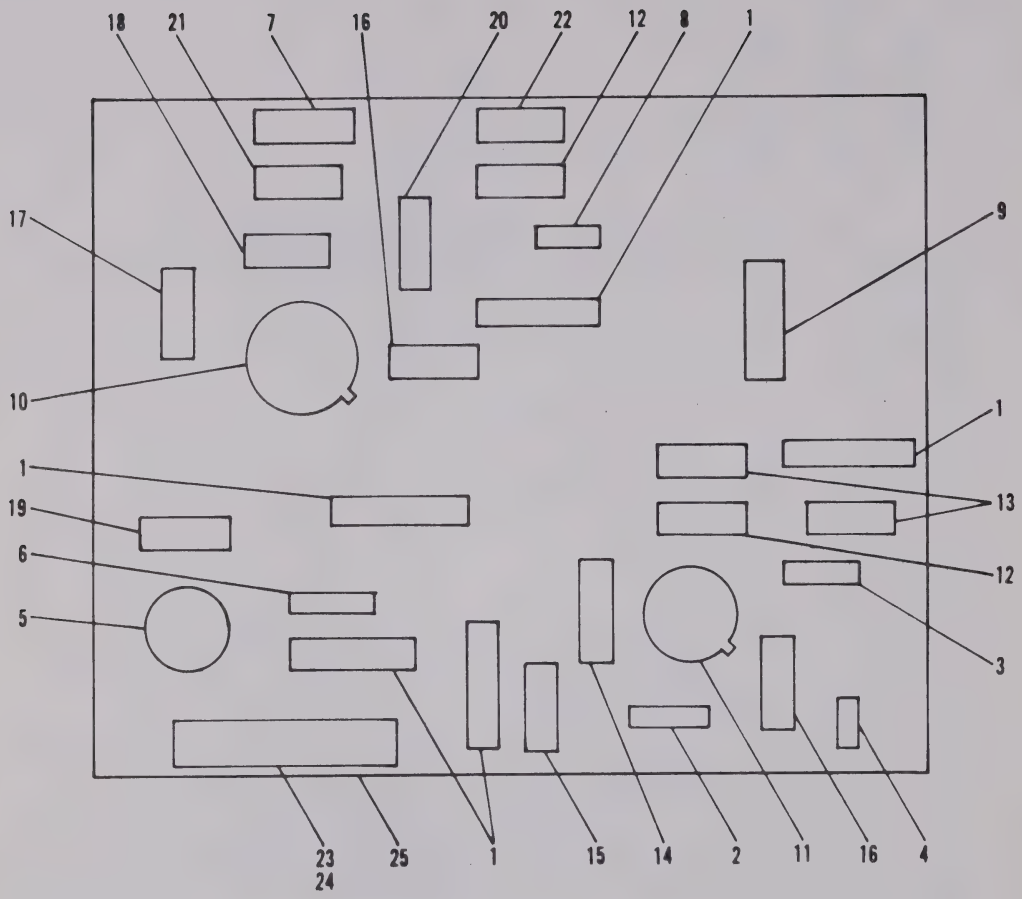


(Schematic 7-5)

Figure 17. Circuit Card Assembly, 1 MHz Amplifier TB601

Fig. & Index No.	Part No. Mfg.	Part No. RCI	Description	Units Per Assy	Reference Designation
17-		A02574	CIRCUIT CARD ASSY, 1 MHz AMPLIFIER (For NHA, see fig. 16)	1	TB601 (Sch. Figure 7-5)
1		D02064	COIL ASSY, RF	1	A601
2	DD-102G	21703	CAPACITOR, FXD, CERAMIC DISC, 1000 pf, 1000WVDC (71590)	5	C601, C604 thru C607
3	5C7	21706	CAPACITOR, FXD CERAMIC DISC, .1uf, ± 20, 25WVDC (72982)	3	C602, C608, C612
4	8121026X05R 102K	21718	CAPACITOR, FXD, CERAMIC DISC, 1000 pf, + 10, 50WVDC (72982)	1	C609
5	2N3323	30251	TRANSISTOR (04713)	2	Q601, Q602
	N88001		INSULATOR, DISC (17069) (AP)	2	
6	2N1396	30754	TRANSISTOR (02735)	1	Q603
	69011-1060		INSULATOR, DISC	1	
7	RC07GF223J	10695	RESISTOR, 22K, 5%, 1/4	2	R601, R607
8	RC07GF682J	10683	RESISTOR, 6.8K, 5%, 1/4	2	R602, R608
9	RC07GF102J	10663	RESISTOR, 1K, 5%, 1/4	3	R603, R606, R612
10	RC07GF821J	10661	RESISTOR, 820, 5%, 1/4	1	R604
11	RC07GF101J	10639	RESISTOR, 100, 5%, 1/4	2	R605, R609
12	RC07GF561J	10657	RESISTOR, 560, 5%, 1/4	1	R610
13	RC07GF330J	10627	RESISTOR, 33, 5%, 1/4	1	R611
14	RC07GF183J	10693	RESISTOR, 18K, 5%, 1/4	1	R613
15	RC07GF562J	10681	RESISTOR, 5.6K, 5%, 1/4	1	R614
16	RC07GF182J	10669	RESISTOR, 1.8K, 5%, 1/4	1	R615
17	RC07GF911J	10662	RESISTOR, 910, 5%, 1/4	1	R617
18	RC07GF393J	10701	RESISTOR, 39K, 5%, 1/4	1	R633
19	8131026X5U0 0332M	21723	CAPACITOR, FXD, CERAMIC DISC, 330pf ±10, 50 WVDC (72982)	1	C610
20	5C023104X025 0B3	21706	CAPACITOR, FXD, CERAMIC, 0.1uf, ± 20%	1	C603
21		C01652	PRINTED WIRING BOARD	1	

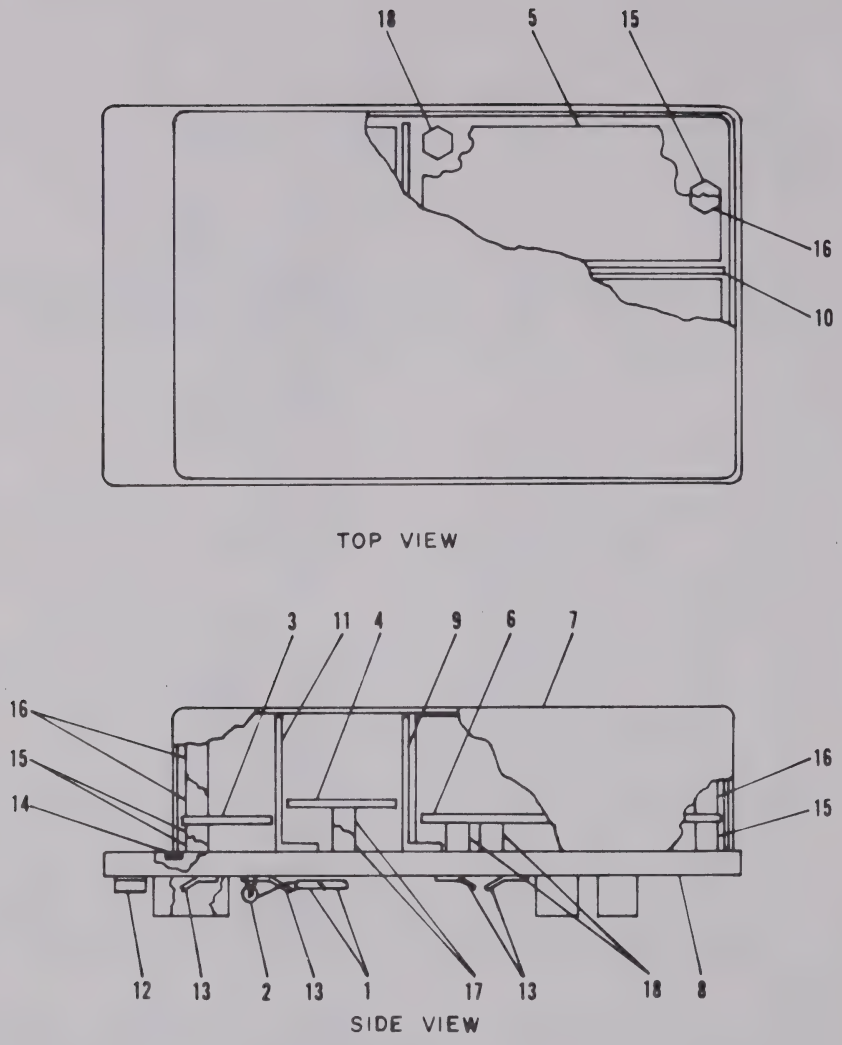


(Schematic 7-5)

Figure 18. Circuit Card Assembly, 1 MHz Oscillator Calibrator

TB602

Fig. & Index No.	Part No. Mfg.	Part No. RCI	Description	Units Per Assy	Reference Designation
18-		A03407	CIRCUIT CARD ASSY, 1 MHz OSCILLATOR CALIBRATOR (For NHA, see fig. 16)	1	TB602 (Sch. Figure 7-5)
1	5C023104X025 OB3	21706	CAPACITOR, FXD, CERAMIC DISC, .1uf +20, 25V	5	C613, C614, C623, C625, C628
2	CD7F221J300	22330	CAPACITOR, FXD, MICA 220pf, 5%, 300 (14655)	1	C616
3	CD7F471J100	22338	CAPACITOR, FXD, MICA, 470pf, 5, 100 (14655)	1	C617
4	8121050W5R102K	21718	CAPACITOR, FXD, CERAMIC DISC (72982) *	1	C618 *1000 pf 200v
5	N-1500	28021	CAPACITOR, VARIABLE, CERAMIC 7-35 pf (Steatite Insulation Ltd., 31 George St., Lozella, Birmingham 19, England)	1	C620
6	CD6C220J500	22306	CAPACITOR, FXD, MICA, 22pf, 5%, 500 (14655)	1	C621
7	SCM225FP020C2	25007	CAPACITOR, FXD, TANTALUM, 2.2uf, 10% 20 (01295)	1	C622
8	CK60AW102M	21702	CAPACITOR, 1000pf, +20, 1000	1	C624
9	1N483B	35512	DIODE (03877)	1	CR601
10	U5B995879X	36509	MICROLOGIC COUNTER CIRCUIT, DECADE (07263)	1	ML601
11	2N3323	30251	TRANSISTOR (04713)	1	Q604
	N88001		INSULATOR, DISC (17069)	1	
12	RC07GF393J	10701	RESISTOR, 39K, 5%, 1/4	2	R618, R631
13	RC07GF103J	10687	RESISTOR, 10K, 5%, 1/4	2	R619, R620
14	RC07GF101J	10639	RESISTOR, 100, 5%, 1/4	1	R621
15	RC07GF682J	10683	RESISTOR, 6.8K, 5%, 1/4	1	R622
16	RC07GF222J	10671	RESISTOR, 2.2K, 5%, 1/4	2	R623, R629
17	RC07GF122J	10665	RESISTOR, 1.2K, 5%, 1/4	1	R624
18	RC07GF273J	10697	RESISTOR, 27K, 5%, 1/4	1	R625
19	RC07GF472J	10679	RESISTOR, 4.7K, 5%, 1/4	1	R626
20	RC07GF181J	10645	RESISTOR, 180, 5%, 1/4	1	R627
21	RC07GF151J	10643	RESISTOR, 150, 5%, 1/4	1	R628
22	RC07GF154J	10715	RESISTOR, 150K, 5%, 1/4	1	R630
23		B02038	CRYSTAL, QUARTZ, 1-MHz	1	Y601
24	380598-1		SOCKET, CRYSTAL	1	
25		D04072	PRINTED WIRING BOARD	1	



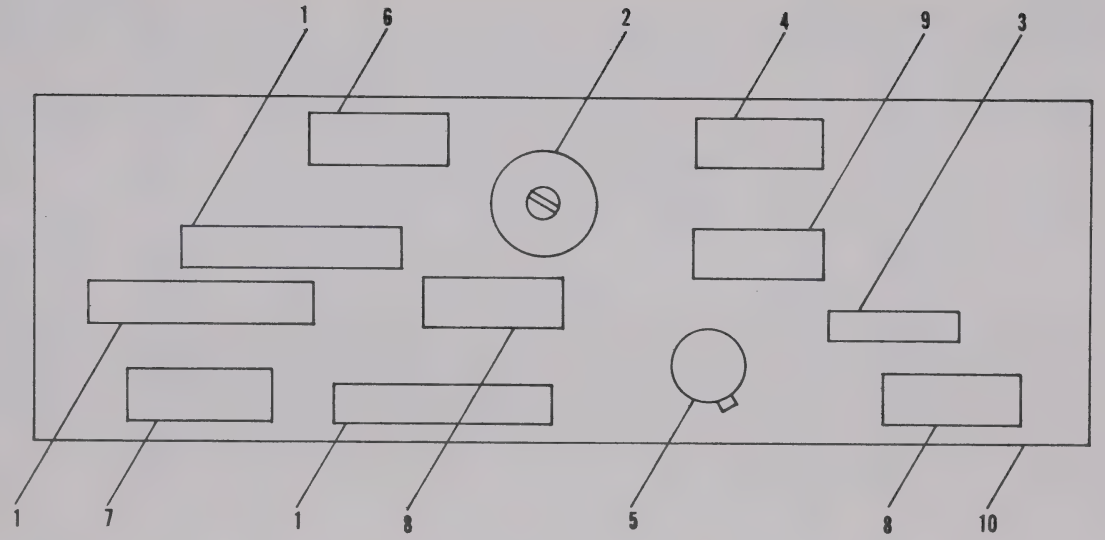
(Schematic 7-6)

Figure 19. Generator Assembly, 37.5-MHz

A108

Fig. & Index No.	Part No. Mfg.	Part No. RCI	Description	Units Per Assy	Reference Designation
19-		A01324-1	GENERATOR ASSEMBLY, 37.5-MHz (For NHA, see fig. 15)	1	A108 (Sch. Figure 7-6)
1	5815Y5U10M	21706	CAPACITOR, FXD, CERAMIC DISC, .luf ±20, 25v	2	C701, C702
2	RC07GF560J	10633	RESISTOR, 56, 5%, 1/4	1	R701
3		A02569	CIRCUIT CARD ASSY, HARMONIC GENERATOR (For details, see fig. 20)	1	TB701
4		A02570	CIRCUIT CARD ASSY, LOWPASS HARMONIC Filter (For details, see fig. 21)	1	TB702
5		A02571	CIRCUIT CARD ASSY, HARMONIC MIXER (For details, see fig. 22)	1	TB703
6		A02572	CIRCUIT CARD ASSY, 37.5-MHz GENERATOR AMPL. (For details, see fig. 23)	1	TB704
	MS35233-3		SCREW, PH (AP)	2	
	5804-5-1		WASHER, SPRING (86928) (AP)	3	
7		B02226	COVER, CHASSIS	1	
	MS35233-13		SCREW, PH (AP)	4	
	MS35338-78		WASHER, SPLIT, LOCK (AP)	4	
	MS15795-304		WASHER, FLAT (AP)	4	
8		C01990	BASE, CHASSIS	1	
9		B01992	PLATE, ELECTRICAL SHIELD	1	
	MS35233-3		SCREW, PH (AP)	2	
	MS35338-77		WASHER, SPLIT, LOCK (AP)	2	
10		B01991	PLATE, ELECTRICAL SHIELD, w/feed-through terminal	1	
	MS35233-3		SCREW, PH (AP)	2	
	MS35338-77		WASHER, SPLIT, LOCK (AP)	2	
11		B02196	PLATE, ELECTRICAL SHIELD	1	
	MS35233-3		SCREW, PH (AP)	2	
	MS35338-77		WASHER, SPLIT, LOCK (AP)	2	
12	3/6-2		CLAMP, CABLE (95987)	1	
			SCREW, FH (AP)	1	
	MS35338-78		WASHER, SPLIT LOCK (AP)	1	
	MS15795-304		WASHER, FLAT (AP)	1	
			NUT (AP)		

Fig. & Index No.	Part No. Mfg.	Part No. RCI	Description	Units Per Assy	Reference Designation
19-13	1488-4		LUG, SOLDER (83330)	4	
	MS35233-13		SCREW, (AP)	4	
	MS35338-78		WASHER, SPLIT, LOCK (AP)	4	
14	11-070		SHIELDING GASKET, ELECTRONIC Knitted wire mesh (12881)	1	
15		SP03-015	STANDOFF (AP)	4	
16		SP03-016	STANDOFF (AP)	4	
	5804-17-1		WASHER, SPRING (49315) (AP)	2	
17		SP03-021	STANDOFF (AP)	2	
	MS35233-2		SCREW, PH (AP)	2	
	MS35233-3		SCREW, PH (AP)	2	
	MS35338-77		WASHER, SPLIT, LOCK (AP)	2	
	5804-5-1		WASHER, SPRING (86928) (AP)	2	
18		SP03-011	STANDOFF (AP)	3	
	MS35233-3		SCREW, PH (AP)	1	
	5804-5-1		WASHER, SPRING (86928) (AP)	2	

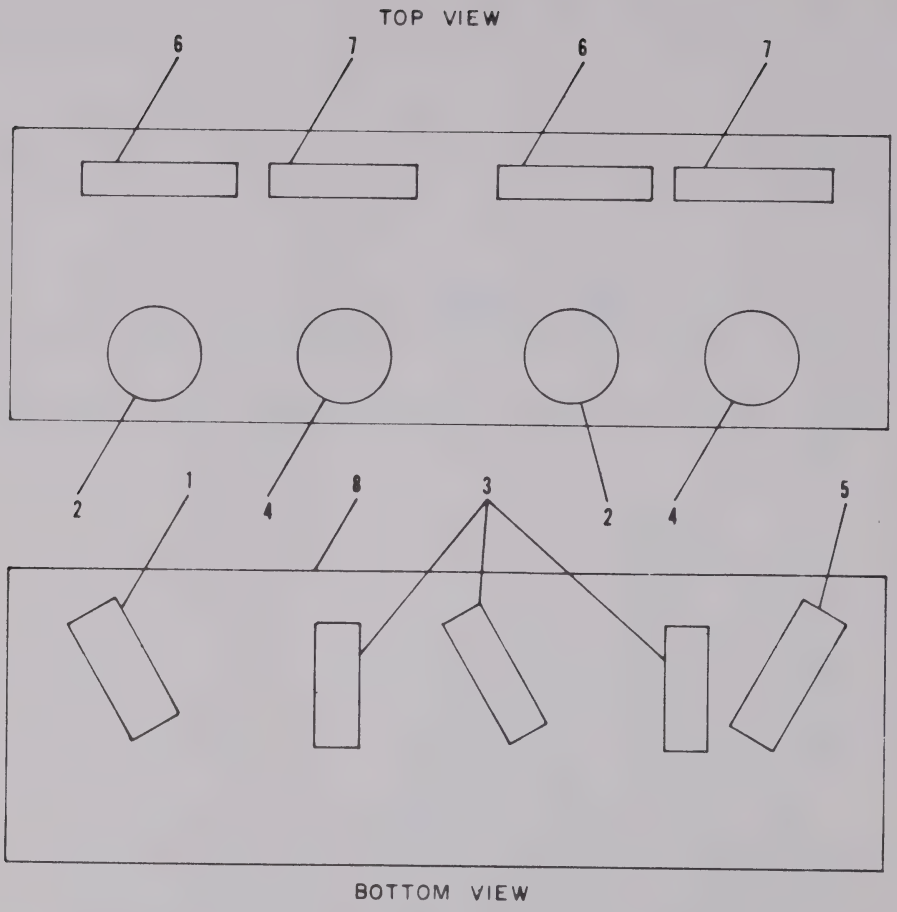


(Schematic 7-6)

Figure 20. Circuit Card Assembly, Harmonic Generator

TB701

Fig. & Index No.	Part No. Mfg.	Part No. RCI	Description	Units Per Assy	Reference Designation
20-		A02569	CIRCUIT CARD ASSY, HARMONIC GENERATOR (For NHA, see fig. 19)	1	TB701 (Sch. Figure 7-6)
1	5C023104X025 0B3	21706	CAPACITOR, FXD, CERAMIC (56289) .1 uf, +20, 25V	3	C703, C704, C705
2	N-1500	28020	CAPACITOR, VARIABLE, CERAMIC 4.5-20pf (Steatite Insulation Ltd., 3 George St., Lozella, Birmingham 19, England)	1	C728
3	CM05F181JN3	22029	CAPACITOR, FXD (14655) 180 uf, 500	1	C729
4	1N281	35508	DIODE (03877)	1	CR701
5	2N2996	30252	TRANSISTOR (01295)	1	Q701
	N88001		INSULATOR, DISC (17069) (AP)	1	
6	RC07GF182J	10669	RESISTOR 1.8K, 5%, 1/4	1	R702
7	RC07GF821J	10661	RESISTOR 820, 5%, 1/4	1	R703
8	RC07GF391J	10653	RESISTOR 390, 5%, 1/4	2	R704, R723
9	RC07GF122J	10665	RESISTOR 1.2K, 5%, 1/4	1	R722
10		B01258	PRINTED WIRING BOARD	1	

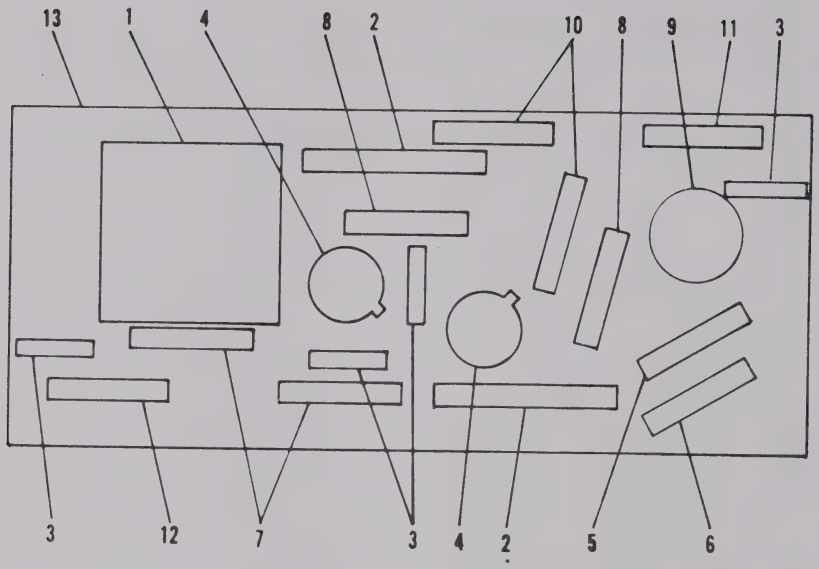


(Schematic 7-6)

Figure 21. Circuit Card Assembly, Harmonic Lowpass Filter

TB702

Fig. & Index No.	Part No. Mfg.	Part No. RCI	Description	Units Per Assy	Reference Designation
21-		A02570	CIRCUIT CARD ASSY, HARMONIC LOWPASS Filter (For NHA, see fig. 19)	1	TB702 (Sch. Figure 7-6)
1	CD6C220J500	22306	CAPACITOR, FXD, MICA 22 pf, 5%, 500 (14655)	1	C707
2		28020	CAPACITOR, VARIABLE, CERAMIC 4.5-20pf	2	C708, C713
3	CD6C270J500	22308	CAPACITOR, FXD, MICA 27 pf, 5%, 500 (14655)	3	C709, C711, C714
4		28021	CAPACITOR, VARIABLE, CERAMIC 7-35pf	2	C710, C715
5	CD6C180J500	22304	CAPACITOR, FXD, MICA, 18 pf, 5%, 500 (14655)	1	C716
6		D02956	COIL ASSY	2	L701, L703
7		D02955	COIL ASSY	2	L702, L704
8		C01261	PRINTED WIRING BOARD	1	

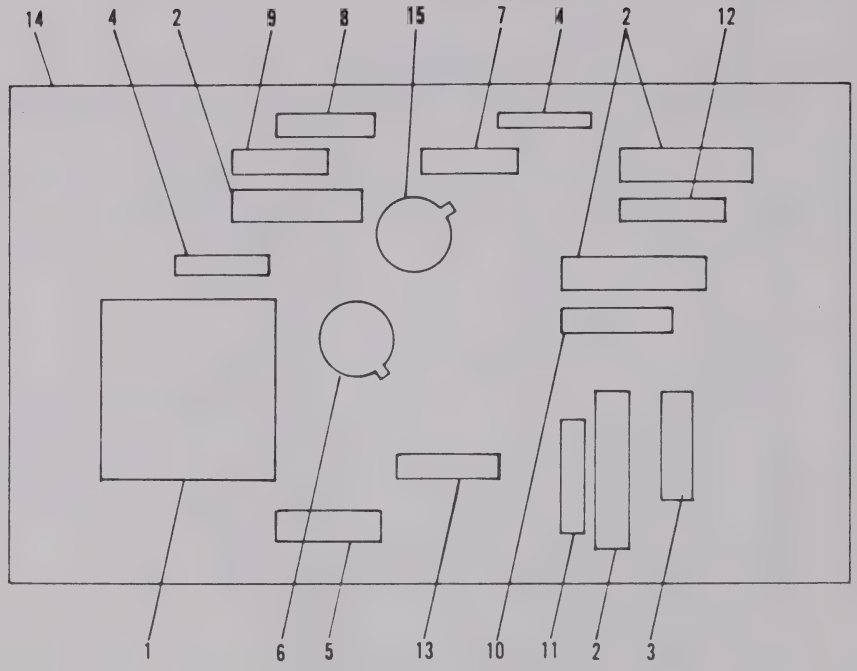


(Schematic 7-6)

Figure 22. Circuit Card Assembly, Harmonic Mixer

TB703

Fig. & Index No.	Part No. Mfg.	Part No. RCI	Description	Units Per Assy	Reference Designation
22-		A02571	CIRCUIT CARD ASSEMBLY, HARMONIC MIXER (For NHA, see fig. 19)	1	TB703 (Sch. Figure 7-6)
1		D02957	COIL ASSY, RF	1	A701
2	5C023104X0250B3	21706	CAPACITOR, FXD, .1 uf, ±20, 25V Ceramic Disc (72982)	2	C717, C718
3	8131066X50332M	21723	CAPACITOR, FXD, 3300 pf, ±10, 50 WVDC (72982)	4	C719, C720, C721, C722
4	2N2996	30252	TRANSISTOR (01295)	2	Q702, Q705
	N88001		INSULATOR, DISC (17069) (AP)	2	
5	RC07GF271J	10649	RESISTOR 270, 5%, 1/4	1	R705
6	RC07GF510J	10632	RESISTOR 51, 5%, 1/4	1	R706
7	RC07GF153J	10691	RESISTOR 15K, 5%, 1/4	2	R707, R713
8	RC07GF472J	10679	RESISTOR 4.7K, 5%, 1/4	2	R708, R712
9	62PR5K	16016	RESISTOR, VARIABLE (06281) 5K, 1/2w	1	R709
10	RC07GF121J	10641	RESISTOR, 120, 5%, 1/4	2	R710, R714
11	RC07GF182J	10669	RESISTOR 1.8K 5%, 1/4	1	R711
12	RC07GF821J	10661	RESISTOR 820, 5%, 1/4	1	R715
13		C01332	PRINTED WIRING BOARD	1	

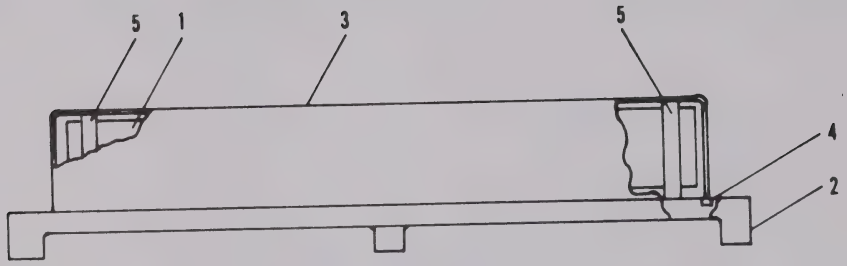


(Schematic 7-6)

Figure 23. CIRCUIT CARD ASSY, 37.5 MHz Generator Amplifier

TB704

Fig. & Index No.	Part No. Mfg.	Part No. RCI	Description	Units Per Assy	Reference Designation
23-		A02572	CIRCUIT CARD ASSY, 37.5-MHz GENERATOR AMPLIFIER (For NHA, see fig. 19)	1	TB704 (Sch. Figure 7-6)
1		D03031	TRANSFORMER, RF	1	A702
2	5C023104X025 0B3	21706	CAPACITOR, FXD, CERAMIC DISC, .1uf +20, 25 (56289)	4	C725, C726, C730, C731
3	3C15	21719	CAPACITOR, FXD, CERAMIC DISC, .047uf, +20, 25 (56289)	1	C727
4	CD6C680J500	22318	CAPACITOR, FXD, MICA, 68pf, ±5, 500 (14655)	2	C732, C734
5	CK60AW102M	21702	CAPACITOR, 1000pf, ±20, 1000	1	C733
6	2N3323	30251	TRANSISTOR (04713)	1	Q704
	N88001		INSULATOR, DISC (17069) (AP)	2	
7	RC07GF273J	10697	RESISTOR, 27K, 5%, 1/4	1	R716
8	RC07GF472J	10679	RESISTOR, 4.7K, 5%, 1/4	1	R717
9	RC07GF681J	10659	RESISTOR, 680, 5%, 1/4	1	R719
10	RC07GF123J	10689	RESISTOR, 12K, 5%, 1/4	1	R720
11	RC07GF822J	10685	RESISTOR, 8.2K, 5%, 1/4	1	R721
12	RC07GF182J	10669	RESISTOR, 1.8K, 5%, 1/4	1	R724
13	RC07GF151J	10643	RESISTOR, 150, 5%, 1/4	1	R725
14		D01259	PRINTED WIRING BOARD	1	
15	2N3283		TRANSISTOR (04713)	1	Q703

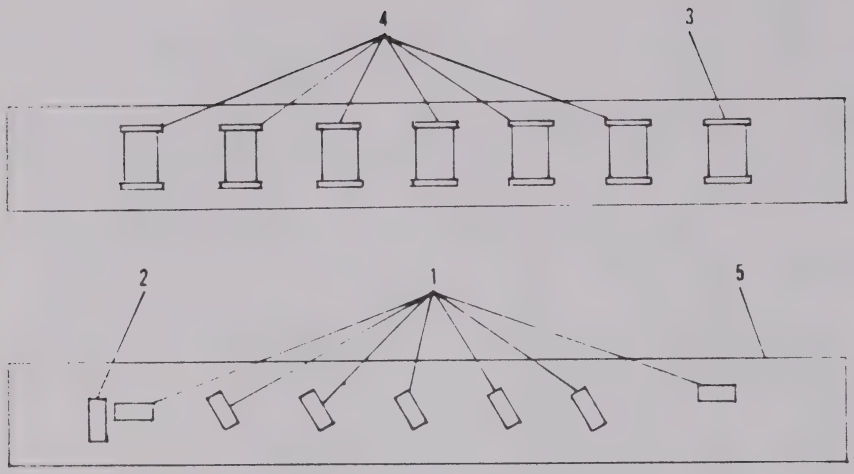


(Schematic 7-7)

Figure 24. Filter Assembly, 37.5-MHz

A106

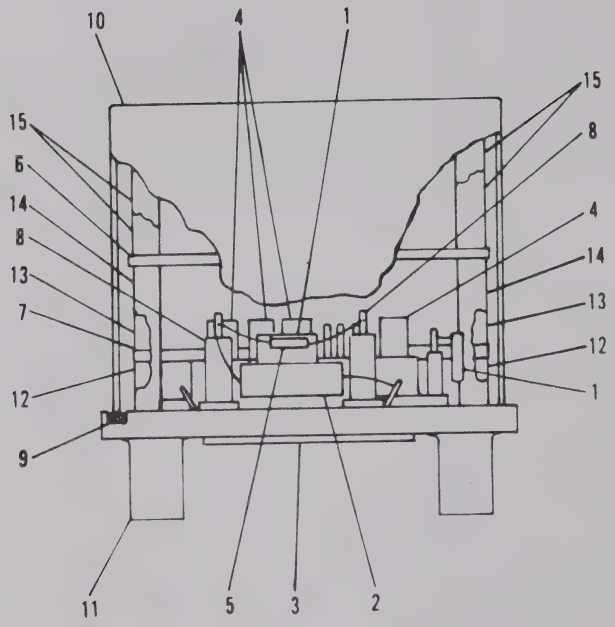
Fig. & Index No.	Part No. Mfg.	Part No. RCI	Description	Units Per Assy	Reference Designation
24-		A01320	FILTER ASSEMBLY, 37.5 MHz (For NHA, see fig. 1)	1	A106 (Sch. Figure 7-7)
1		A02585-1	CIRCUIT CARD ASSY, FILTER, 37.5 MHz (For details, see fig. 25)	1	TB801
	MS35233-12	76011	SCREW, PH (AP)	2	
	5804-17-1	75003	WASHER, SPRING, NO. 4 (94144) (AP)	2	
2		C01978	BASE, CHASSIS, MACHINED	1	
3		C01977	COVER, CHASSIS	1	
	MS35233-13	76012	SCREW, PH (AP)	2	
	MS35338-78	75002	WASHER, SPLIT, LOCK (AP)	2	
	MS15795-304	75023	WASHER, FLAT (AP)	2	
4	11-070	70950	SHIELDING GASKET, ELECTRONIC, KNITTED Wire Mesh (12881)	1	
5		C01450-1	STANDOFF (AP)	2	
	MS35233-15	76014	SCREW, PH (AP)	2	
	1488-4	70007	LUG, SOLDER (83330)	2	



(Schematic 7-7)

Figure 25. Circuit Card Assembly, 37.5-MHz Filter

Fig. & Index No.	Part No. Mfg.	Part No. RCI	Description	Units Per Assy	Reference Designation
25-		A02585-1	CIRCUIT CARD ASSY, 37.5-MHz FILTER (For NHA, see fig. 24)	1	TB801 (Sch. Figure 7-7)
1		26810	CAPACITOR, FXD, POLYSTYRENE, 56 pf, ±2.5%, 125V	7	C801 thru C807
2		26822	CAPACITOR, FXD, POLYSTYRENE, 560 pf, ±5%, 33V	1	C808
3		D02972	COIL ASSY, VARIABLE	1	L801
4		D02971	COIL ASSY, VARIABLE	6	L802 thru L807
5		B01967	PRINTED WIRING BOARD	1	



(Schematic 7-10)

Figure 26. Mixer Assembly, Third

A104

Fig. & Index No.	Part No. Mfg.	Part No. RCI	Description	Units Per Assy	Reference Designation
26-	Used RA6217A Used RA6217A-3	A01323-1 A02290	MIXER ASSEMBLY, THIRD (For NHA, see fig. 1)	1	A104 (Sch. Fig. 7-10 Sheet 1) (Sch. Fig. 7-10 Sheet 2)
1	5C023104X0250B3	21706	CAPACITOR, FXD, CERAMIC DISC, .1uf, +20, 25V, (56289)	1	C918
2	TE1209	24005	CAPACITOR, FXD, ELECTROLYTIC, 50mf, 25V (56289)	1	C919
3	DBMF-9W4P-326	60018	CONNECTOR, ELECTRICAL (71785)	1	P901
	MS35249-11		SCREW, FH (AP)	2	
	MS35338-77		WASHER, SPLIT, LOCK (AP)	2	
	MS35649-24		NUT (AP)	2	
	4890-1-0516		STANDOFF (12284) (AP)	1	
4	DM53743-5000	60025	CONNECTOR, COAXIAL, RIGHT ANGLE (71785)	4	P901, A1, A2, A3, A4
5	RC07GF680J	10635	RESISTOR, 68, 5%, 1/4	1	R918
6	Used RA6217A Used RA6217A-3	A02576-2 A02576-1	CIRCUIT CARD ASSY, THIRD MIXER (For details, see fig. 27)	1	TB901
7	Used RA6217A-3	A02577	CIRCUIT CARD ASSY, 1.6 MHz AMPLIFIER, (For details, see fig. 28)	1	TB902
8	2003-91-1		TERMINAL, SOLDER	2	
	MS35233-13		SCREW, PH (AP)	2	
	MS35338-78		WASHER, SPLIT, LOCK (AP)	2	
	1485-4		LUG, SOLDER (83330) (AP)	2	
9	11-070		SHIELDING GASKET, ELECTRONIC KNITTED Wire Mesh (12881)	1	
10		B02408	COVER, CHASSIS BASE	1	
	MS35233-12		SCREW, PH (AP)	4	
	MS35338-78		WASHER, SPLIT, LOCK (AP)	4	
11		C02099	BASE, CAST MACHINED	1	
	2003-91-1		TERMINAL, SOLDER (17117) (AP)	2	
	1485-4		LUG, SOLDER (83330) (AP)	2	
	MS35233-12		SCREW, PH (AP)	2	
12	9725-SS-0440-7		STANDOFF (06540) (AP)	2	
	5804-17-1		WASHER, SPRING (86928) (AP)	2	
13	9735-SS-0440-7		STANDOFF (06540)	2	
	5804-17-1		WASHER, SPRING (86928) (AP)	2	
14	9736-SS-0440-7		STANDOFF (06540)	2	
	5804-17-1		WASHER (86928) (AP)	2	

Fig. & Index No.	Part No. Mfg.	Part No. RCI	Description	Units Per Assy	Reference Designation
26-14	MS35233-13		SCREW, PH (AP)	4	
	MS35338-78		WASHER, SPLIT, LOCK (AP)	4	
	MS15795-304		WASHER, FLAT (AP)	4	
15	9735-SS-0440-7		STANDOFF (06540)	4	
	5804-17-1		WASHER, SPRING (86928) (AP)	4	

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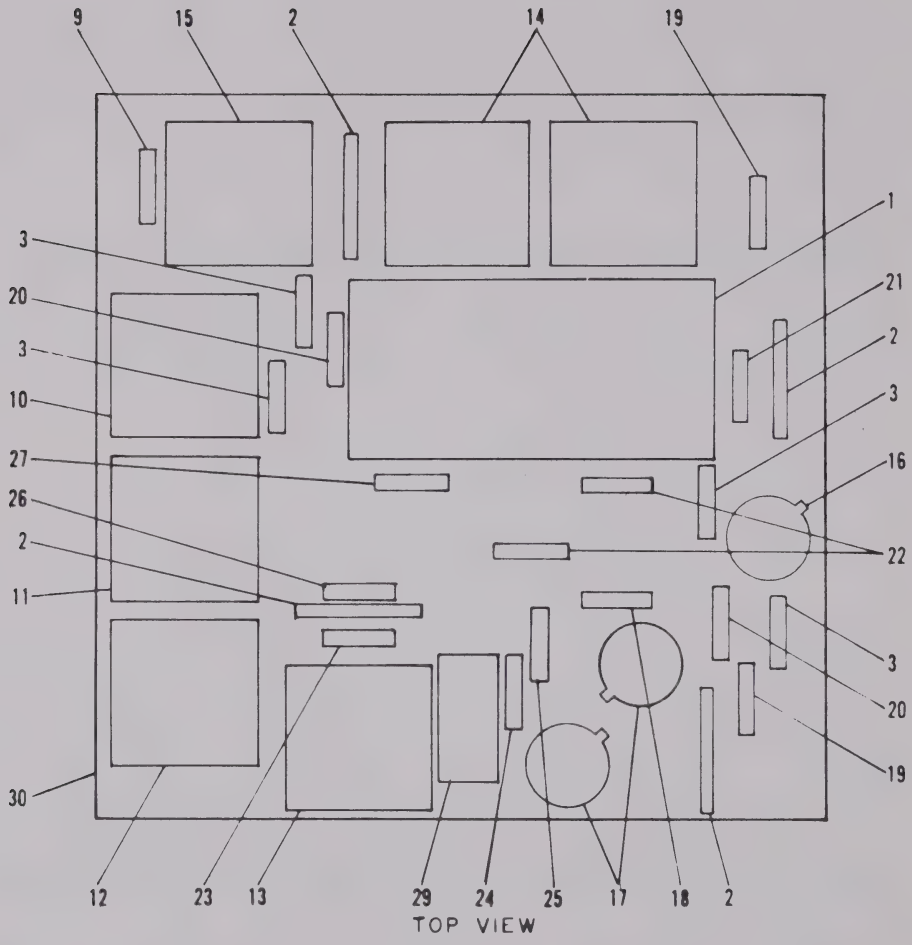
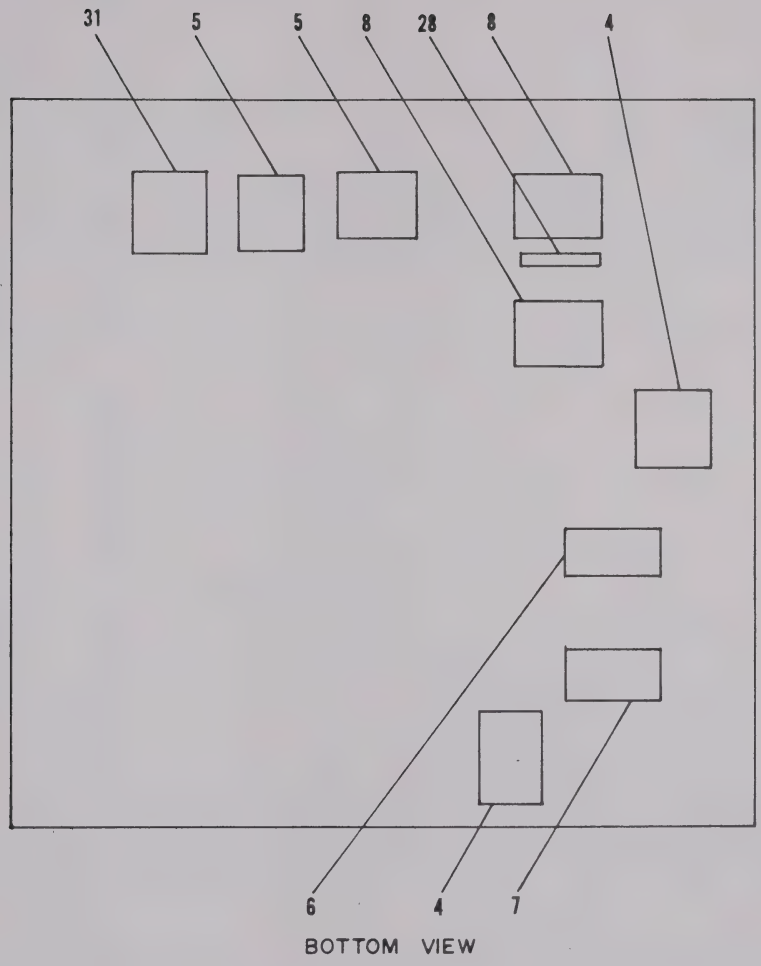


(Schematic 7-10)

Figure 27. CIRCUIT CARD ASSY, THIRD MIXER

TB901



(Schematic 7-10)

Figure 27. CIRCUIT CARD ASSY, THIRD MIXER

TB901

Fig. & Index No.	Part No. Mfg.	Part No. RCI	Description	Units Per Assy	Reference Designation
27-	Used RA6217A-3	A02576-1	CIRCUIT CARD ASSY, THIRD MIXER (For	1	TB901 (Sch. Figure 7-10) Sheet 2
	Used RA6217A	A02576-2	NHA, see fig. 26)		(Sch. Figure 7-10)Sheet 1
1		C02274	TRANSFORMER, RF	1	A901
2	5C023104X0250B3	21706	CAPACITOR, FXD, CERAMIC DISC (72982) .1uf	4	C901, C903, C912, C913
3	8121026X5U0 382M	21723	CAPACITOR, FXD, CERAMIC (72982) 3300pf	4	C902, C904, C914, C915
4	CD7F151J500	22326	CAPACITOR, FXD, MICA, 150pf, 5%, 500 (14655)	2	C905, C911
5	CD7F181J500	22328	CAPACITOR, FXD, MICA, 180pf, 5%, 500 (14655)	2	C906, C909
6	CD6C390J500	22312	CAPACITOR, FXD, MICA, 39pf, 5%, 500 (14655)	1	C907
7	CD6C680J500	22318	CAPACITOR, FXD, MICA 68pf, 5%, 500 (14655)	1	C910
8	CD7F821J100	22344	CAPACITOR, FXD, MICA 820pf, 5%, 100 (14655)	2	C916, C917
9	1N483B	35512	DIODE (03877)	1	CR901
10		D02965	COIL ASSY, VARIABLE	1	L901
11		D02967	COIL ASSY, VARIABLE	1	L902
12		D02966	COIL ASSY, VARIABLE	1	L903
13		D02969	COIL ASSY, VARIABLE	1	L904
14		D02136	COIL ASSY, VARIABLE	2	L905, L906
15		D02970	COIL ASSY, VARIABLE	1	L908
16	2N2996	30252	TRANSISTOR (01295)	1	Q901
	N88001		INSULATOR, DISC (17069) (AP)	1	
17	2N2368	31254	TRANSISTOR (07263)	2	Q902, Q903
	N88001		INSULATOR, DISC (17069) (AP)	2	
18	RC07GF331J	10651	RESISTOR, 330, 5%, 1/4	1	R901
19	RC07GF102J	10663	RESISTOR, 1K, 5%, 1/4	2	R902, R905
20	RC07GF183J	10693	RESISTOR, 18K, 5%, 1/4	2	R903, R916
21	RC07GF100J	10615	RESISTOR, 10, 5%, 1/4	1	R904
22	RC07GF392J	10677	RESISTOR, 3.9K, 5%, 1/4	2	R906, R912
23	RC07GF820J	10637	RESISTOR, 82, 5%, 1/4	1	R907
24	RC07GF681J	10659	RESISTOR, 680, 5%, 1/4	1	R909
25	RC07GF152J	10667	RESISTOR, 1.5K, 5%, 1/4	1	R910

Fig. & Index No.	Part No. Mfg.	Part No. RCI	Description	Unit-Per Assy	Reference Designation
27-26	RC07GF222J	10671	RESISTOR, 2.2K, 5%, 1/4	1	R913
27	RC07GF823J	10709	RESISTOR, 82K, 5%, 1/4	1	R915
28	RC07GF390J	10629	RESISTOR, 39, 5%, 1/4	1	R917
29		D02265-2	TRANSFORMER, RF	1	T901
30		D01257	PRINTED WIRING BOARD	1	
31	Used RA6217A-3	21723	CAPACITOR, FXD, CERAMIC, 3300pf	1	C908
	Used RA6217A	21720	CAPACITOR, FXD, CERAMIC, .01uf	1	C908

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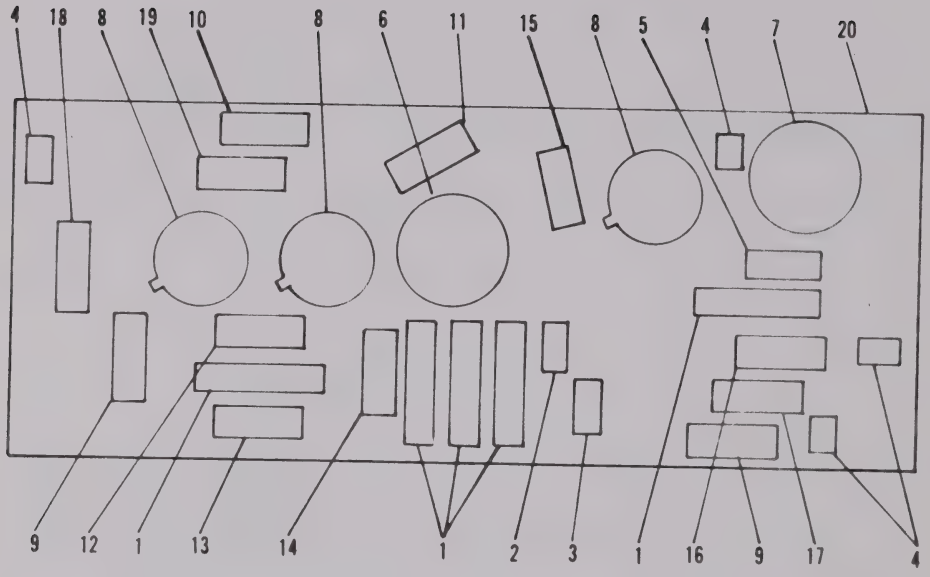

(Schematic 7-10 sheet 2)

Figure 28. Circuit Card Assembly 1.6 MHz Wideband Amplifier

Fig. & Index No.	Part No. Mfg.	Part No. RCI	Description	Units Per Assy	Reference Designation
28-	Used RA6217A-3	A02577	CIRCUIT CARD ASSY, 1.6-MHz AMPLIFIER (For NHA, see fig. 26)	1	TB902 (Sch. 7-10 sheet 2)
1	5C023104X025 0B3	21706	CAPACITOR, FXD, CERAMIC DISC, .1uf, ±20, 25V	5	C920, C921, C924, C925, C931
2	CD6F121J300	22324	CAPACITOR, FXD, MICA 120pf ±5, 300v (14655)	1	C922
3	CD7F561J100	22340	CAPACITOR, FXD, MICA 560pf, ±5, 300v (14655)	1	C923
4	8131-026-X5U 0332M	21723	CAPACITOR, FXD, CERAMIC (72982) 3300 pf	4	C926, C927, C929, C930
5	CD7F391J100	22336	CAPACITOR, FXD, MICA, 390pf (14655)	1	C928
6	WEE VL100	47031	COIL ASSY, VARIABLE (72259)	1	L909
7	WEE VL3.9	47030	COIL ASSY, VARIABLE (72259)	1	L910
8	2N3323	30251	TRANSFORMER (04713)	3	Q904, Q905, Q906
	N88001	70752	INSULATOR, DISC (17069) (AP)	3	
9	RC07GF472J	10679	RESISTOR, FIXED COMP., 4.7K, 1/4W, ±5%	2	R919, R926
10	RC07GF222J	10671	RESISTOR, FIXED COMP., 2.2K, 1/4W, ±5%	1	R920
11	RC07GF333J	10699	RESISTOR, FIXED COMP., 33K, 1/4W, ±5%	1	R921
12	RC07GF390J	10629	RESISTOR, FIXED COMP., 39, 1/4W, ±5%	1	R922
13	RC07GF681J	10659	RESISTOR, FIXED COMP., 680, 1/4W, ±5%	1	R923
14	RC07GF822J	10685	RESISTOR, FIXED COMP., 8.2K, 1/4W, ±5%	1	R924
15	RC07GF153J	10691	RESISTOR, FIXED COMP., 15K, 1/4W, ±5%	1	R925
16	RC07GF510J	10632	RESISTOR, FIXED COMP., 51, 1/4W, ±5%	1	R927
17	RC07GF331J	10651	RESISTOR, FIXED COMP., 330, 1/4W, ±5%	1	R928
18	RC07GF473J	10703	RESISTOR, FIXED COMP., 47K, 1/4W, ±5%	1	R930
19	RC07GF123J	10689	RESISTOR, FIXED COMP., 12K, 1/4W, ±5%	1	R931
20		C02405	PRINTED WIRING BOARD	1	

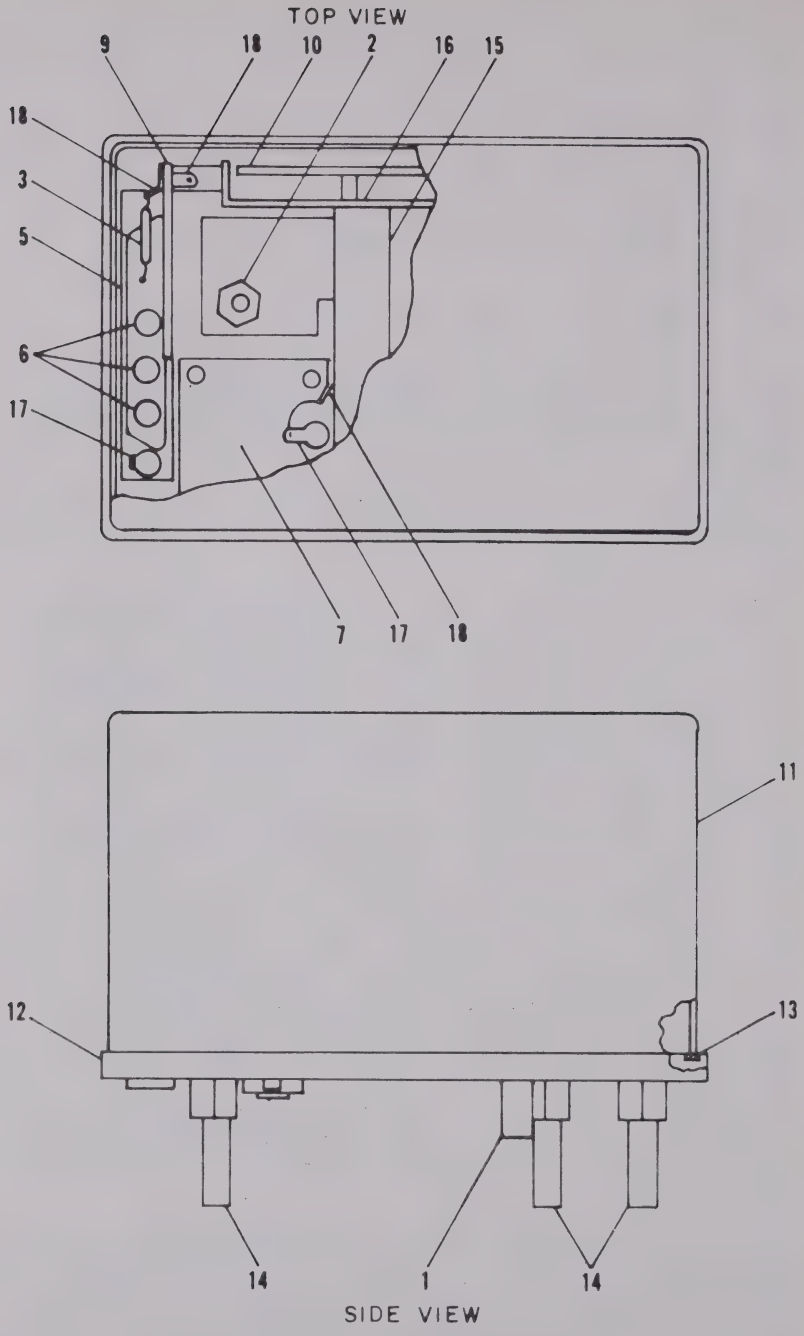

Figure 29. Oscillator Assembly, Variable Frequency Second (Sch 7-9)

A1007

Fig. & Index No.	Part No. Mfg.	Part No. RCI	Description	Units Per Assy	Reference Designation
29-		A05030	OSCILLATOR ASSY, VARIABLE FREQUENCY Second (For NHA, see fig. 1) (SCH G05031)	1	A1007 (Sch. Fig. 7-9)
1		C02838	CAPACITOR, VARIABLE, AIR DIELECTRIC, 13pf (73899)	1	C1003
	MS35223-27	76026	SCREW, PH (AP), 6-32, 5/16 in lg	3	
	MS35338-79	75003	WASHER, SPLIT, LCOK, NO. 6	3	
2	NVC26G	29500	CAPACITOR, VARIABLE CERAMIC, 0.8 13pf (73899)	1	C1004
3	5C023104X0250B3 OB3	21706	CAPACITOR, FXD, CERAMIC DISC, 0.1 uf, ±20%, 25V (56289)	1	C1018
4	Not Used				
5	DBM9W4P-326	60034	CONNECTOR, ELECTRICAL (71785)	1	J1001
	MS35249-11	76511	SCREW, FH, 2-56, 5/16 in lg (AP)	2	
	MS35338-77	75001	WASHER, SPLIT, LOCK No. 2 (AP)	2	
	MS35649-24	75201	NUT, 2-56 (AP)	2	
	MS15795-302	75021	WASHER, FLAT NO. 2 (AP)	1	
6	DM53742-5006	60020	CONNECTOR, RF, COAXIAL (71785)	3	J1001-A1, J1001-A2, J1001-A3
7		D05027	COIL ASSY, RF	1	L1001
	MS35233-14	76013	SCREW, PH, 4-40, 5/16 in lg (AP)	2	
	MS35338-78	75002	WASHER, SPLIT, LOCK, NO. 4 (AP)	2	
8	Not Used				
9		A05028-1	CIRCUIT CARD ASSY, OSCILLATOR, VARIABLE FREQUENCY, 2ND (For details, see fig. 30)	1	TB1001
	MS35233-27	76026	SCREW, PH, 6-32, 5/16 in lg (AP)	2	
	MS35338-79	75003	WASHER, SPLIT, NO. 6 (AP)	2	
	MS15795-305	75024	WASHER, FLAT, NO. 6 (AP)	2	
	1488-6	70005	LUG, SOLDER, NO. 6 (83330) (AP)	2	
10		A05029-1	CIRCUIT CARD ASSY, AMPLIFIER, BUFFER (For details, see fig. 31)	1	TB1002
	MS35233-3	76002	SCREW, PH, 2-56, 1/4 in lg (AP)	4	
	MS35338-77	75001	WASHER, SPLIT, LOCK NO. 2 (AP)	4	
11		B02247-3	COVER, SECOND VFO Assembly	1	
	MS35233-13	76012	SCREW, PH, 4-40, 1/4 in lg (AP)	2	
	MS35338-78	75002	WASHER, SPLIT, LOCK, NO. 4 (AP)	2	
	MS15795-304	75023	WASHER, FLAT, NO. 4 (AP)	2	

Fig. & Index No.	Part No. Mfg.	Part No. RCI	Description	Units Per Assy	Reference Designation
29-12		C03400	END PLATE, SECOND VFO ASSEMBLY	1	
13	11-070		SHIELDING GASKET, ELECTRONIC Knitted Wire Mesh, 13-12 in lg (12881)	1	
14		A03471	STANDOFF, MOUNTING, SECOND VFO	3	
	MS15795-308	75027	WASHER, FLAT, NO. 10 (AP)	3	
		75217	NUT, 10-32 NF (AP)	3	
15		B03475	BRACKET, SUPPORT, CENTER	1	
	MS35233-14	76013	SCREW, PH, 4-40, 5/16 in lg (AP)	2	
	MS35338-78	75002	WASHER, SPLIT LOCK, NO. 4 (AP)	2	
		76400	SCREW, FH, 4-40, 3/8 in lg (AP)	2	

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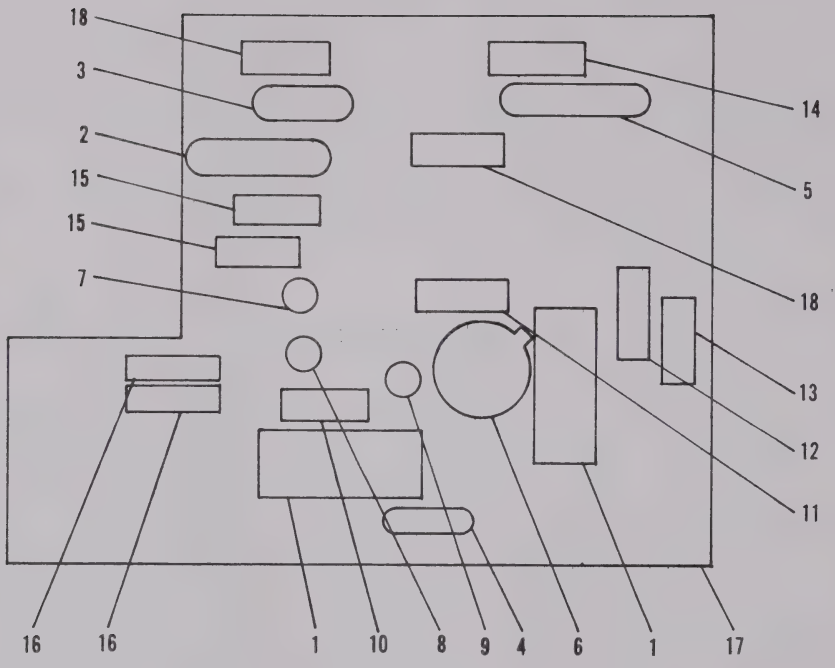


Figure 30. Circuit Card Assembly, Second VFO (Sch 7-9)

TB1001

Fig. & Index No.	Part No. Mfg.	Part No. RCI	Description	Units Per Assy	Reference Designation
30-		A05028-1	CIRCUIT CARD ASSY, SECOND VFO (For NHA, see fig. 29)	1	TB1001 (Sch 7-9)
1		26861	CAPACITOR, FXD, POLYCARBONATE, 0.01 uf, 400V, NPO (56289)	2	C1001, C1002
2	10TCC-050	21003	CAPACITOR 50pf NPO	1	C1005
3	10TCP-Q22	21337	CAPACITOR, FXD, CERAMIC, TUBULAR, 22 pf, (72982) N150	1	C1006
4	3C023473X0 0250B1	21719	CAPACITOR, FXD, CERAMIC, 0.047 uf, ±20% 25V (56289)	1	C1007
5	8131-050-651-1 04M	21732	CAPACITOR, .1 uf, ±20%, 50V		C1008
6	2N918	31500	TRANSISTOR (07263)	1	Q1001
7	RC07GF101J	10639	RESISTOR, FIXED COMP., 100, 1/4W, ±5%		R1001
8	RC07GF391J	10653	RESISTOR, FIXED COMP., 390, 1/4W, ±5%	1	R1002
9	RC07GF122J	10665	RESISTOR, FIXED COMP., 1.2K, 1/4W, ±5%	1	R1003
10	RC07GF123J	10689	RESISTOR, FIXED COMP., 12K, 1/4W, ±5%	1	R1004
11	RC07GF681J	10659	RESISTOR, FIXED COMP., 680, 1/4W, ±5%	1	R1005
12	RC07GF100J	10615	RESISTOR, FIXED COMP., 10, 1/4W, ±5%	1	R1006
13	RC07GF331J	10651	RESISTOR, FIXED COMP., 330, 1/4W, ±5%		R1007
14	RC07GF473J	10703	RESISTOR, FIXED COMP., 47K, 1/4W, ±5%		R1008
15	1N711A	33512	DIODE, ZENER, 7.5V (99942)	2	VR1001, VR1002
16	1N709A	33513	DIODE, ZENER, 6.2 V (99942)	2	VR1003, VR1004
17		B02236	PRINTED WIRING BOARD	1	
18	MV830	29009	VARICAP	2	CR1001, CR1002

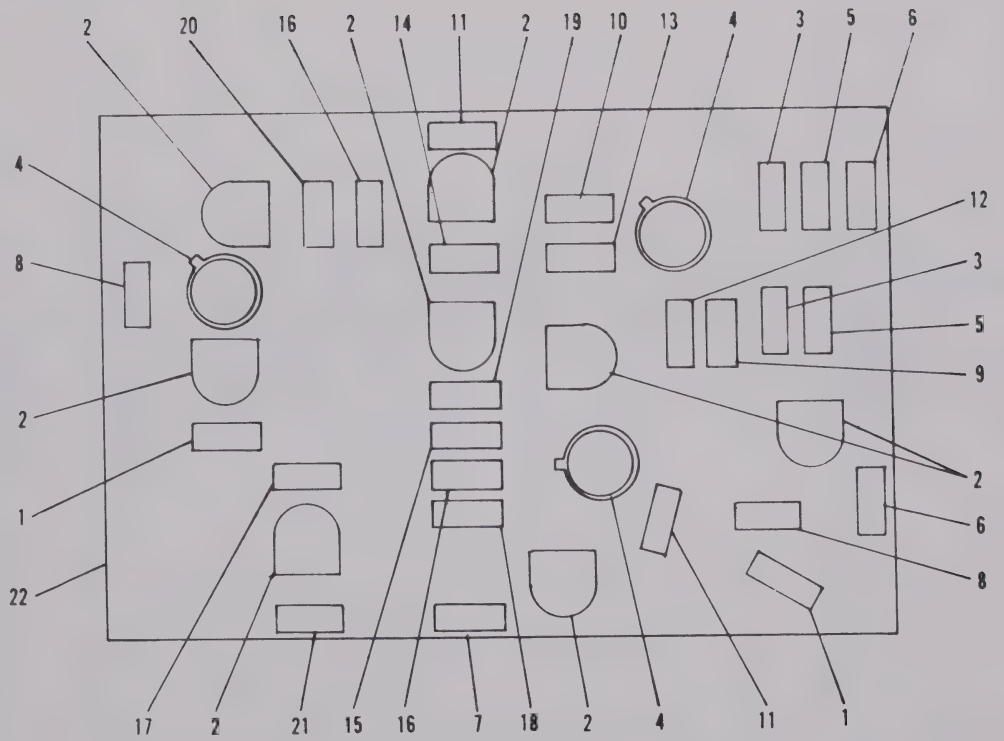
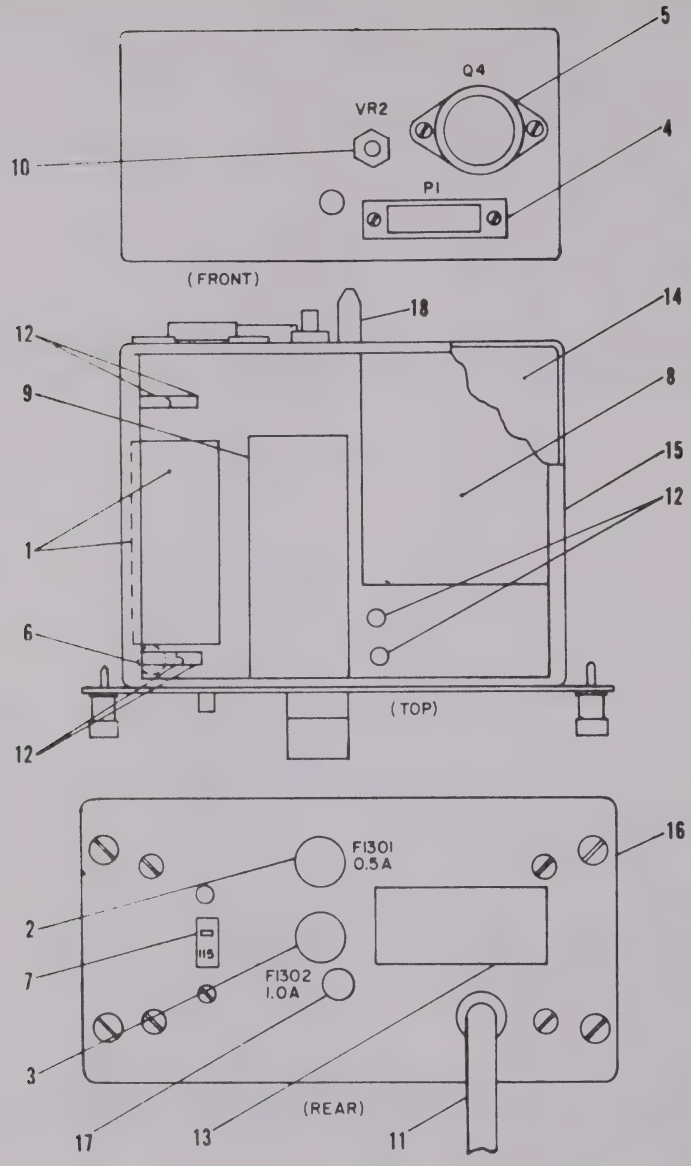


Figure 31. Circuit Card Assembly, Buffer Amplifier (Sch 7-9)

TB1002

Fig. & Index No.	Part No. Mfg.	Part No. RCI	Description	Units Per Assy	Reference Designation
31-		A05029-1	CIRCUIT CARD ASSY, BUFFER AMPLIFIER (For NHA see fig. 29)	1	TB1002 (Sch 7-9)
1	K1J35KS	25010	CAPACITOR, FXD, TANTALUM 1.0uf, ±10% 35V	2	C1008, C1009
2	5835000Y5U203M	21731	CAPACITOR, FXD CERAMIC DISC, 0.02 uf, +20%, 25V (72982)	8	C1010, C1011, C1012 C1013, C1014, C1015, C1016, C1017
3	1N916	35514	DIODE (01295)	2	CR1001, CR1002
4	2N918	31500	TRANSISTOR (07263)	3	Q1002, Q1003, Q1004
5	RC07GF154J	10715	RESISTOR, FIXED COMP., 150K, 1/4W, ±5%	2	R1009, R1013
6	RC07GF182J	10669	RESISTOR, FIXED COMP., 1.8K, 1/4W, ±5%	2	R1010, R1012
7	RC07GF391J	10653	RESISTOR, FIXED COMP., 390, 1/4W, ±5%	1	R1011
8	RC07GF750J	10636	RESISTOR, FIXED COMP., 75, 1/4W, ±5%	2	R1014, R1030
9	RC07GF682J	10683	RESISTOR, FIXED COMP., 6.8K, 1/4W, ±5%	1	R1015
10	RC07GF680J	10635	RESISTOR, FIXED COMP., 68, 1/4W, ±5%	1	R1016
11	RC07GF102J	10663	RESISTOR, FIXED COMP., 1K, 1/4W, ±5%	2	R1017, R1026
12	RC07GF152J	10667	RESISTOR, FIXED COMP., 1.5K, 1/4W, ±5%	1	R1018
13	RC07GF820J	10637	RESISTOR, FIXED COMP., 82, 1/4W, ±5%	1	R1020
14	RC07GF560J	10633	RESISTOR, FIXED COMP., 56, 1/4W, ±5%	1	R1021
15	RC07GF103J	10687	RESISTOR, FIXED COMP., 10K, 1/4W, ±5%	1	R1022
16	RC07GF273J	10697	RESISTOR, FIXED COMP., 27K, 1/4W, ±5%	2	R1023, R1028
17	RC07GF681J	10659	RESISTOR, FIXED COMP., 680, 1/4W, ±5%	1	R1024
18	RC07GF220J	10623	RESISTOR, FIXED COMP., 22, 1/4W, ±5%	1	R1025
19	RC07GF472J	10679	RESISTOR, FIXED COMP., 4.7K, 1/4W, ±5%	1	R1027
20	RC07GF101J	10639	RESISTOR, FIXED COMP., 100, 1/4W, ±5%	1	R1029
21	1N715A	33537	DIODE, ZENER, 11V, 1/4W, 5% (99942)	1	VR1005
22		C02237	PRINTED WIRING BOARD		



(Schematic 7-22)

Figure 32. Power Unit MA6302

A113

Fig. & Index No.	Part No. Mfg.	Part No. RCI	Description	Units Per Assy	Reference Designation
32-		A02088	POWER UNIT MA6302 (For NHA, see fig. 1)	1	A113 (Sch. Figure 7-22)
1	39D507G050GL4	24014	CAPACITOR, FXD. ELECTROLYTIC, 500uf, +75 -10, 50V (56289)	2	C1303, C1304
2	313-500	40011	FUSE, SLOW BLOW, 0.5 AMPERE (75915)	1	F1301
3	313-001	40012	FUSE, SLOW BLOW, 1 AMPERE (75915)	1	F1302
4	DAMF15S	61020	CONNECTOR, ELECTRICAL, 15-contact female (71785)	1	P1301
	MS35233-4	76003	SCREW, PH (AP)	2	
	MS35338-77	75001	WASHER, SPLIT, LOCK (AP)	2	
	MS35649-24	75201	NUT (AP)	2	
5	2N3614	30751	TRANSISTOR (04713)	1	Q1304
	5210-2	75114	INSULATOR, FLAT (86928) (AP)	1	
	MS35233-16	76015	SCREW, PH (AP)	2	
	MS35338-78	75002	WASHER, SPLIT, LOCK (AP)	2	
	5804-8-1	75112	WASHER, FLAT (86928) (AP)	2	
	5608-10	75113	WASHER, SHOULDER (86928) (AP)	2	
	MS35649-44	75214	NUT (AP)	1	
	1488-4	70007	LUG, SOLDER (83330) (AP)	1	
6	RC42GF4R7	14032	RESISTOR, WIREWOUND, 4.7, 3W, ±5	1	R1302
7	46206LF	52405	SWITCH, SLIDE DPDT (82389)	1	S1301
	MS35233-13	76012	SCREW, PH (AP)	2	
	MS35338-78	75002	WASHER, SPLIT, LOCK (AP)	2	
	MS35649-44	75214	NUT (AP)	2	
8		D01650	TRANSFORMER, POWER, 5 to 1 RATIO, FULL Load 1 amp	1	T1301
	MS35233-27	76026	SCREW, PH (AP)	4	
	MS35338-79	75003	WASHER, SPLIT, LOCK (AP)	4	
9		A02584-1	CIRCUIT CARD ASSY, RECTIFIER-REGULATOR (For details, see fig. 33)	1	TB1301
	MS35233-26	76025	SCREW, PH (AP)	3	
	MS35338-79	75003	WASHER, SPLIT, LOCK (AP)	3	
	MS15795-305	75024	WASHER, FLAT (AP)	3	
10	1N2983RA	33527	DIODE, ZENER, 19V, 5W, ±10,(04713)	1	VR1302
11	174085J	57001	CALBE ASSY, POWER ELECTRICAL	1	W1301
	SR-6W-1	70700	BUSHING (AP)	1	

Fig. & Index No.	Part No. Mfg.	Part No. RCI	Description	Units Per Assy	Reference Designation
32-12	2003-91-1	80072	STANDOFF, INSULATED ELECTRONIC	6	
		76400	SCREW, FH (AP)	6	
	1486-4	70008	LUG, SOLDER (83330) (AP)	5	
13		B05068-1	PLATE, NAME	1	
		79021	SCREW, PH (AP)	2	
14		B02107	COVER, CHASSIS	1	
			SCREW, FH (AP)	6	
15		B02106	CHASSIS	1	
16		B02071	PANEL	1	
	MS35233-26	76025	SCREW, PH (AP)	4	
	MS35338-79	75003	WASHER, SPLIT, LOCK (AP)	4	
17	1711	81950	PLUG, FILLER	1	
18		A04994	STUD, GUIDE	1	
		76417	SCREW, FH (AP)	1	
	MS35338-79	75003	WASHER, SPLIT, LOCK (AP)	1	

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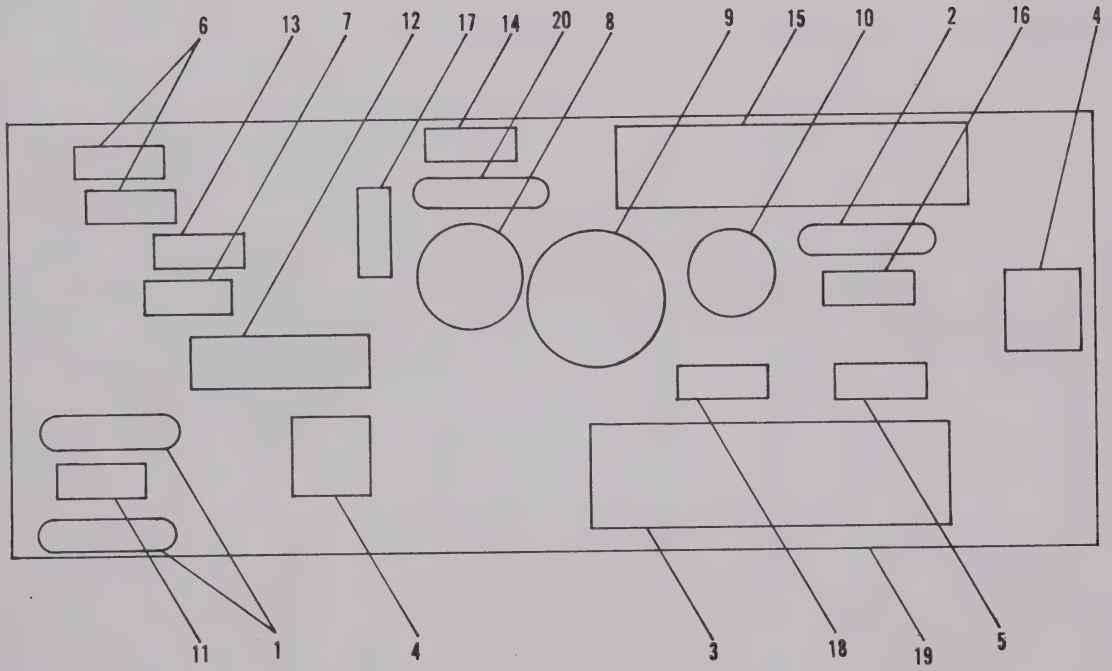
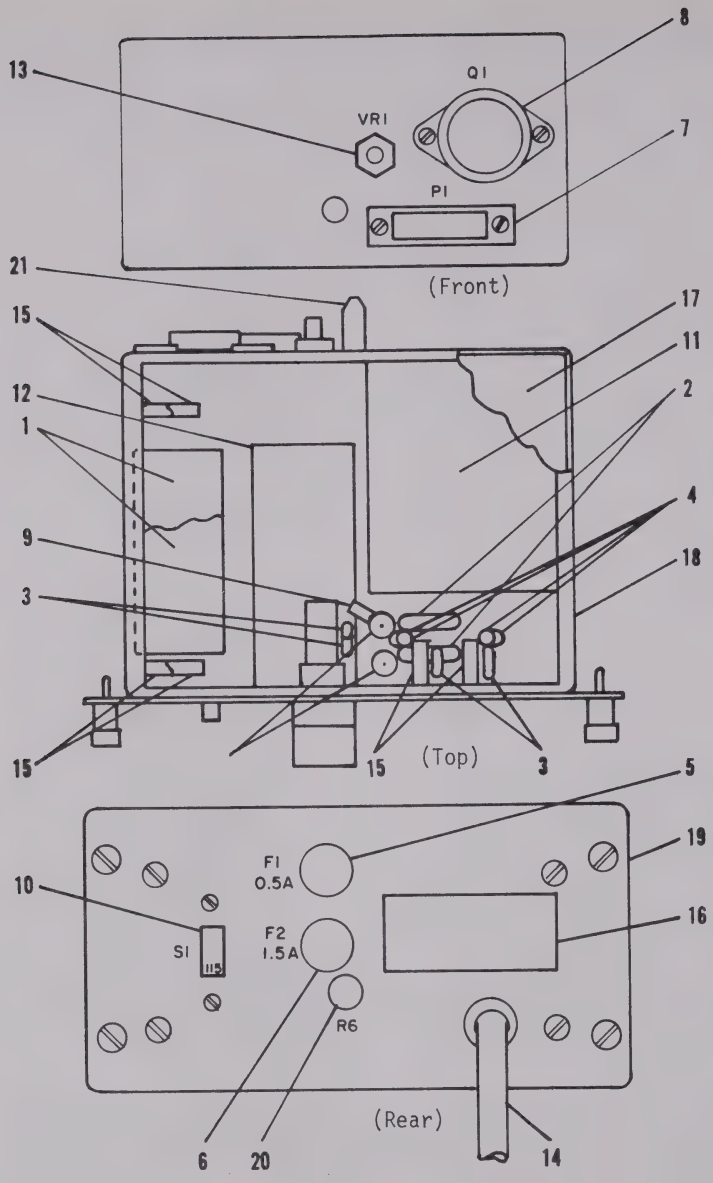


(Schematic 7-22)

Figure 33. Circuit Card Assembly, Rectifier-Regulator

(MA6302)

Fig. & Index No.	Part No. Mfg.	Part No. RCI	Description	Units Per Assy	Reference Designation
33-		A02584-1	CIRCUIT CARD ASSY, RECTIFIER-REGULATOR (For NHA, see fig. 32)	1	(Sch. Figure 7-22)
1	5HKS20	21717	CAPACITOR, FXD, CERAMIC DISC, .02uf, +80,-20, 500VDC (56289)	2	C1301, C1302
2	5C023104X025 0B3	21706	CAPACITOR, FXD, CERAMIC, .1uf, ±20, 25VDC (56289)	1	C1306
3	TE1211	24015	CAPACITOR, FXD, ELECTROLYTIC, 100 uf, +75,-10, 25VDC (56289)	1	C1307
4	MDA920A2	35513	RECTIFIER, BRIDGE, DIODE (04713)	2	CR1301, CR1305
5	1N753A	33507	DIODE, ZENER, 6.2V, 400mv (04713)	1	VR1301
6	1N916	35514	DIODE, (01295)	2	CR1302, CR1303
7	1N626	35507	DIODE, (01295)	1	CR1304
8	2N3242	31251	TRANSISTOR (04713)	1	Q1301
	69011-1060	70751	INSULATOR	1	
9	2N1189	30750	TRANSISTOR (04713)	1	Q1302
	69011-1060	70751	INSULATOR	1	
10	2N722	31507	TRANSISTOR (07263)	1	Q1303
	N88001	70752	INSULATOR (17069) (AP)	1	
11	RC07GF104J	10711	RESISTOR, FXD, COMP., 100K, 1/4W, 5%	1	R1301
12	RC32GF183J	11293	RESISTOR, FXD, COMP., 18K, 1W, 5%	1	R1303
13	RC07GF680J	10635	RESISTOR, FXD, COMP., 68, 1/4W, 5%	1	R1304
14	RC07GF272J	10673	RESISTOR, FXD. COMP., 27K, 1/4W, 5%	1	R1306
15	3067P-1-102	16013	RESISTOR, VARIABLE, 1K (80294)	1	R1307
16	RC07GF222J	10671	RESISTOR, FXD, COMP., 2.2K, 1/4W, 5%	1	R1308
17	RC07GF331J	10651	RESISTOR, FXD, COMP., 330, 1/4W, 5%	1	R1309
18	RC07GF122J	10665	RESISTOR, FXD. COMP., 1.2K, 1/4W, 5%	1	
19		C02888	PRINTED WIRING BOARD	1	
20		21712	CAPACITOR, FXD. ceramic, .001uf, ±10, 1000VDC	1	C1305



(Schematic 7-22a)

Figure 32a. Power Unit MA6304

Fig. & Index No.	Part No. Mfg.	Part No. RCI	Description	Units Per Assy	Reference Designation
32a-		A04907	POWER UNIT MA6304 (For NHA see fig. 1)	1	A113 (Sch Fig 7-22a)
1	39D507G050GL4	24014	CAPACITOR, FXD. ELECTROLYTIC, 500uf, +75, -10 50V (56289)	2	C1303, C1304
2		21734	CAPACITOR, DISC .02uf +20% 125VAC	2	C1301, C1302
3		21702	CAPACITOR, CERAMIC 0.001uf	4	C1305, C1306, C1307, C1308
4		99971	FERRITE BEAD	4	E1301, E1302, E1303, E1304
5	313-500	40011	FUSE, SLOW BLOW, 0.5 AMPERE (75915)	1	F1301
6	313-001	40015	FUSE, SLOW BLOW, 1.5 AMPERE (75915)	1	F1302
7	DAMf15S	61020	CONNECTOR, ELECTRICAL, 15-contact female (71785)	1	P1301
	MS35233-4	76003	SCREW, PH (AP)	2	
	MS35338-77	75001	WASHER, SPLIT, LOCK (AP)	2	
	MS35649-24	75201	NUT (AP)	2	
8	2N3055	32003	TRANSISTOR (04713)	1	Q1301
	5210-2	75114	INSULATOR, FLAT (86928) (AP)	1	
	MS35233-16	76015	SCREW, PH (AP)	2	
	MS35338-78	75002	WASHER, SPLIT, LOCK (AP)	2	
	5804-8-1	75112	WASHER, FLAT (86928) (AP)	2	
	5608-10	75113	WASHER, SHOULDER (86928) (AP)	2	
	MS35649-44	75214	NUT (AP)	1	
	1488-4	7007	LUG, SOLDER (83330) (AP)	1	
9	RC07GF104J	10711	RESISTOR, COMP. 100k 1/4W +5%	1	R1301
10	46206LF	52405	SWITCH, SLIDE DPDT (82389)	1	S1301
	MS35233-13	76012	SCREW, PH (AP)	2	
	MS35338-78	75002	WASHER, SPLIT, LOCK (AP)	2	
	MS35649-44	75214	NUT (AP)	2	
11		D01650	TRANSFORMER, POWER, 5 to 1 ratio, full load 1 amp	1	T1301
	MS35233-27	76026	SCREW (AP)	4	
	MS35338-79	75003	WASHER, SPLIT, LOCK (AP)	4	
12		A04787-1	CIRCUIT CARD ASSY, RECTIFIER-REGULATOR (for details see fig. 33a)		
	MS35233-26	76025	SCREW, PH (AP)	3	
	MS35338-79	75003	WASHER, SPLIT, LOCK (AP)	3	
	MS15795-305	75024	WASHER, FLAT (AP)	3	
13	1N2983RA	33527	DIODE, ZENER, 19V, 5W +10, (04713)	1	VR1301

Fig. & Index No.	Part No. Mfg.	Part No. RCI	Description	Units Per Assy	Reference Designation
32a-					
14	174085J	57001	CABLE ASSY, POWER ELECTRICAL	1	W1301
	SR-6W-1	70700	BUSHING (AP)	1	
15	2003-91-1	80072	STANDOFF, INSULATED, ELECTRONIC	8	
		76400	SCREW, FH (AP)	8	
	1486-4	7008	LUG, SOLDER (83330) (AP)	5	
16		B05068-1	PLATE, NAME	1	
		79021	SCREW, PH (AP)	2	
17		B02107	COVER, CHASSIS	1	
			SCREW, FH (AP)	6	
18		B02106	CHASSIS	1	
19		B02071	PANEL	1	
	MS35233-26	76025	SCREW, PH (AP)	4	
	MS35338-79	75003	WASHER, SPLIT, LOCK (AP)	4	
20	1711	81950	PLUG, FILLER	1	
21		A04994	STUD, GUIDE	1	
		76417	SCREW, FH (AP)	1	
	MS35338-79	75003	WASHER, SPLIT, LOCK (AP)	1	

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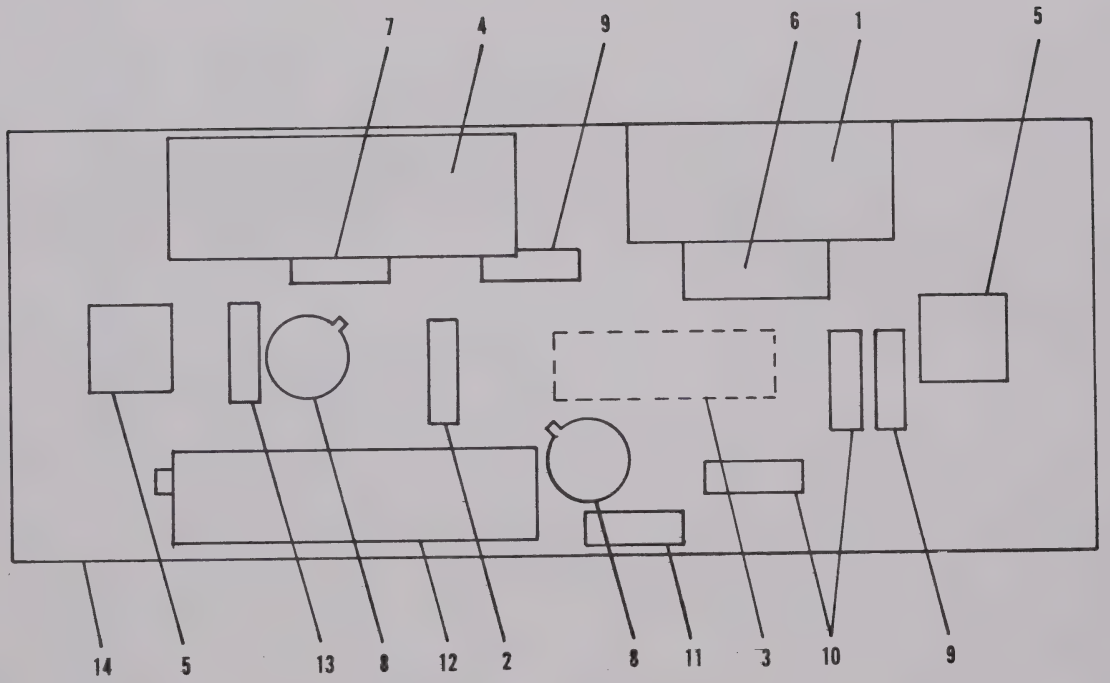
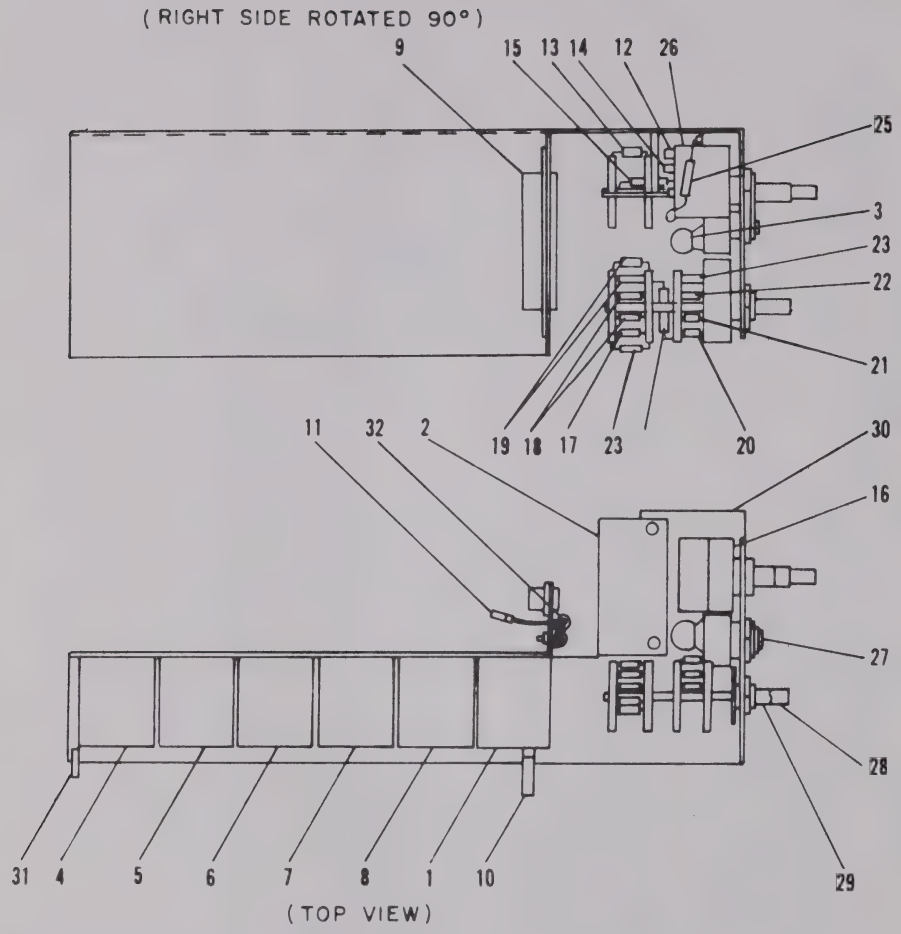


(Schematic 7-22a)

Figure 33a. Circuit Card Assembly, Rectifier-Regulator

(MA6304)

Fig. & Index No.	Part No. Mfg.	Part No. RCI	Description	Units Per Assy	Reference Designation
33a-		A04787	CIRCUIT CARD ASSY, RECTIFIER-REGULATOR (For NHA, see fig. 32a)	1	(Sch. Figure 7-22a)
1	TE1207	24011	CAPACITOR, FXD, ELECTROLYTIC 25 uf, +100, -20, 25VDC (56289)	1	A1 C1301
2	8131-050-651-103M	21732	CAPACITOR, FXD, CERAMIC, .1uf, ±20, 50VDC (72982)	1	A1 C1302
3	-----Not Used-----				
4	TE1211	24015	CAPACITOR, FXD, ELECTROLYTIC, 100uf, +75, -10, 25VDC (56289)	1	A1 C1304
5	MDA920A2	35513	RECTIFIER, BRIDGE, DIODE (04713)	2	A1 CR1301, AL CR1302
6	SZ3.6A	33528	DIODE, ZENER, 3.6V, 1w	1	A1 VR1301
7	1N710A	35514	DIODE, ZENER 6.8V	1	A1 VR1302
8	2N722	31507	TRANSISTOR	2	A1 Q1301, A1 Q1302
	69011-1060	70751	INSULATOR	1	
9	RC07GF103J	10663	RESISTOR, FXD. COMP., 1K, 1/4W, 5%	2	A1 R1301, A1 R1304
10	RC07GF222J	10671	RESISTOR, FXD. COMP., 2.2K, 1/4W, 5%	2	A1 R1302, A1 R1303
11	RC07GF392J	10677	RESISTOR, FXD. COMP., 3.9K 1/4W, 5%	1	A1 R1305
12	3067P-1-102	16013	RESISTOR, VARIABLE, 1K (80294)	1	A1 R1306
13	RC07GF332J	10675	RESISTOR, FXD COMP., 3.3K, 1/4W, 5%	1	A1 R1307
14		C04106	PRINTED WIRING BOARD	1	



(Schematic 7-1 and 7-11)

Figure 34. Crystal Filter and IF Amplifier Assembly

A110

Fig. & Index No.	Part No. Mfg.	Part No. RCI	Description	Units Per Assy	Reference Designation
34-		A02087-1	CRYSTAL FILTER AND IF AMPLIFIER ASSEMBLY (For NHA, see fig. 1)	1	A110 (Sch. Figure 7-1)
1		A02054	AMPLIFIER ASSY, FIRST IF (For details, see fig. 35)	1	A3201 (Sch. Figure 7-11)
	MS35233-2	76001	SCREW, PH (AP)	2	
	MS35338-77	75001	WASHER, SPLIT, LOCK (AP)	2	
2		A01774	CIRCUIT CARD ASSY, EMITTER-FOLLOWER AND METER ZERO (For details, see fig. 37)	1	A3202
		SP01-023	STANDOFF, (AP)	2	
	MS35233-2	76001	SCREW, PH (AP	2	
	5804-50k	75110	WASHER, SPRING, (86928) (AP)	2	
3	CE102	21712	CAPACITOR, FXD, CERAMIC DISC, 0.001uf, +10%, 500V (71590)	1	C3201
4		C01533	FILTER, BANDPASS, CRYSTAL, 13-kHz	1	FL3201
	MS35233-13	76012	SCREW, PH (AP)	10	
	MS35338-78	75002	WASHER, SPLIT, LOCK (AP)	10	
5		C01512	FILTER, BANDPASS, CRYSTAL, 200-Hz	1	FL3202
	MS35233-13	76012	SCREW, PH (AP)	10	
	MS35338-78	75002	WASHER, SPLIT, LOCK (AP)	10	
6		C01513	FILTER, BANDPASS, CRYSTAL, 1-KHz	1	FL3202
	MS35233-13	76012	SCREW, PH (AP)	10	
	MS35338-78	75002	WASHER, SPLIT, LOCK (AP)	10	
7		C01514	FILTER, BANDPASS, CRYSTAL, 3-KHz	1	FL3204
	MS35233-13	76012	SCREW, PH (AP)	10	
	MS35338-78	75002	WASHER, SPLIT, LOCK, (AP)	10	
8		C01515	FILTER, BANDPASS, CRYSTAL, 6-kHz	1	FL3205
	MS35233-13	76012	SCREW, PH (AP)	10	
	MS35338-78	75002	WASHER, SPLIT, LOCK, (AP)	10	
9	DCMF37S	61019	CONNECTOR, ELECTRICAL, FEMALE, 37 contact (71785)	1	J3201
	MS35233-4	76003	SCREW, PH (AP)	2	
	MS35338-77	75001	WASHER, SPLIT, LOCK, (AP)	2	
	MS35649-24	75201	NUT (AP)	2	

Fig. & Index No.	Part No. Mfg.	Part No. RCI	Description	Units Per Assy	Reference Designation
34-10	1026/196	60032	CONNECTOR, RF, COAXIAL (16733)	1	P3201
11	1002	60024	CONNECTOR, RF, COAXIAL (16733)	1	P3202
12	RC07GF221J	10647	RESISTOR, FXD COMP., 220 ohm 1/4W, ±5%	1	R3201
13	RC07GF470J	10631	RESISTOR, FXD COMP., 47 ohm, 1/4W, ±5%	1	R3202
14	RC07GF101J	10639	RESISTOR, FXD COMP., 100 ohm, 1/4W ±5%	1	R3203
15	RC07GF560J	10633	RESISTOR, FXD COMP., 56 ohm, 1/4W, ±5%	1	R3204
16		A03882	RESISTOR, VARIABLE, 10K ohm, 1W, ±20%	1	R3205
17	RC07GF153J	10691	RESISTOR, FXD COMP., 15K, 1/4W, ±5%	1	R3206
18	RC07GF682J	10683	RESISTOR, FXD COMP., 6.8K, 1/4W, ±5%	2	R3207, R3208
19	RC07GF472J	10679	RESISTOR, FXD COMP., 4.7K, 1/4W, ±5%	2	R3209, R3210
20	RC07GF222J	10671	RESISTOR, FXD COMP., 2.2K, 1/4W, ±5%	1	R3212
21	RC07GF123J	10689	RESISTOR, FXD COMP., 12K, 1/4W, ±5%	1	R3213
22	RC07GF223J	10695	RESISTOR, FXD COMP., 22K, 1/4W, ±5%	1	R3214
23	RC07GF393J	10701	RESISTOR, FXD COMP., 39K, 1/4W, ±5%	2	R3215, R3216
24	RC07GF822J	10685	RESISTOR, FXD COMP., 8.2K, 1/4W, ± 5%	1	R3217
25			RESISTOR (Determinied by test)	1	R3218
26		B02161	RESISTOR, VARIABLE, A500 ohm linear taper	1	R3219A
		B02161	RESISTOR, VARIABLE, 10K ohm, log taper	1	R3219B
27		A03881	RESISTOR, VARIABLE, 10K ohm, 1W	1	R3220
28		C01744	SWITCH, ROTARY	1	S3201
29		C01611	SWITCH, ROTARY	1	S3202
30		D03898	CHASSIS, CRYSTAL FILTER & IF AMPLIFIER	1	
31	1485-4	70020	LUG, SOLDER (83330)	1	
		76400	SCREW, FH, (AP)	1	
	MS35338-78	75002	WASHER, SPLIT, LOCK (AP)	1	
		75203	NUT, (AP)	1	
32	1/8-4	81261	CLAMP, CABLE	1	
	MS35683-4	76003	SCREW, PH (AP)	1	
	MS35338-77	75001	WASHER, SPLIT, LOCK (AP)	1	
	MS15795-302	75021	WASHER, FLAT (AP)	1	
	MS35649-24	75201	NUT, (AP)	1	

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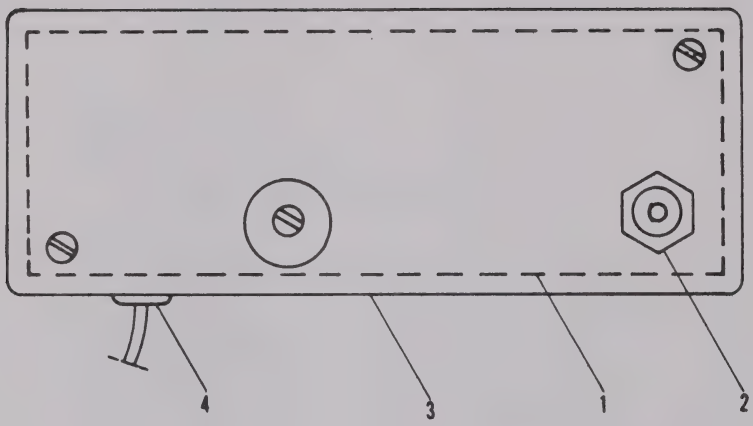
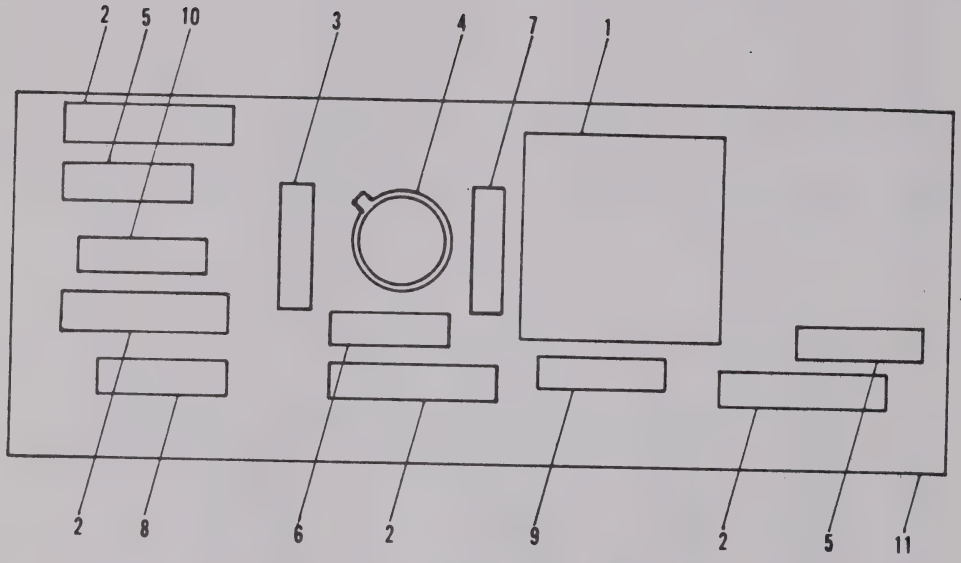


(Schematic 7-11)

Figure 35. Amplifier Assembly First IF

A3201

Fig. & Index No.	Part No. Mfg.	Part No. RCI	Description	Units Per Assy	Reference Designation
35-		A02054	AMPLIFIER ASSY, FIRST IF (For NHA, see fig. 34)	1	A3201 (Sch. Figure 7-11)
1		A02580E	CIRCUIT CARD ASSY, FIRST IF AMPLIFIER (For details, see fig. 36)	1	TB1601
		SP03-018	STANDOFF (AP)	2	
		SP01-021	STANDOFF (AP)	2	
	5804-5-1		WASHER, SPRING (86928) (AP)	2	
2		D01974-4	CABLE ASSY, COAXIAL, RG196A/U	1	
	RG-196A/U		CABLE	1	
	UG-1463/U		CONNECTOR	1	
3		C02059	COVER, MARKING	1	
	MS35233-2		SCREW (AP)	2	
	MS35338-77		WASHER, SPLIT, LOCK (AP)	2	
4	Z2318		GROMMET (76385)	1	

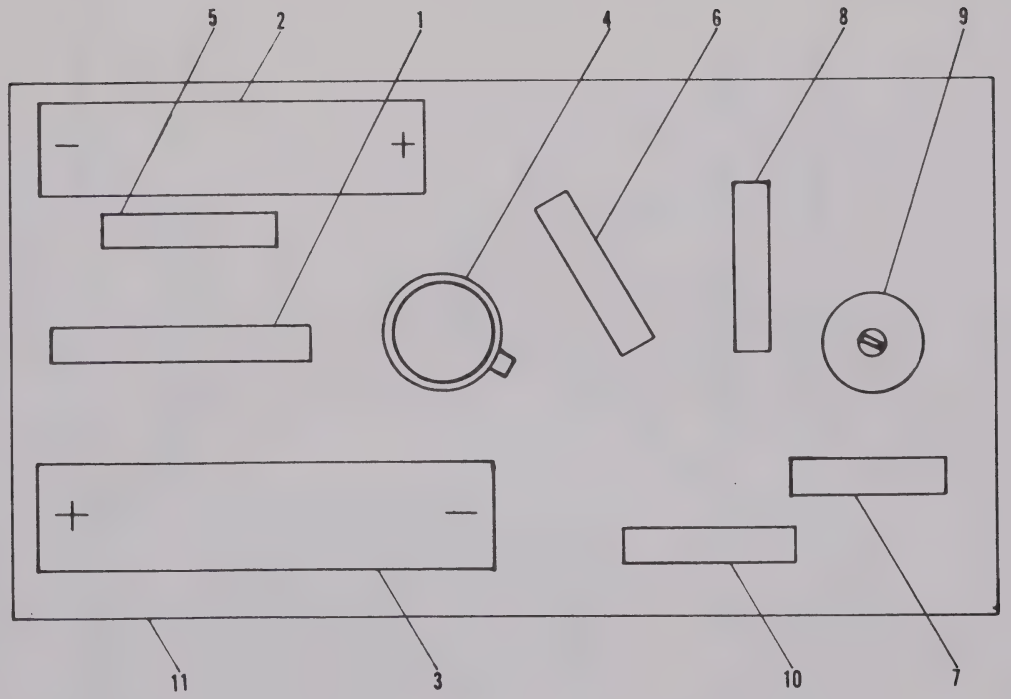


(Schematic 7-11)

Figure 36. Circuit Card Assembly, First IF Amplifier

TB1601

Fig. & Index No.	Part No. Mfg.	Part No. RCI	Description	Units Per Assy	Reference Designation
36-		A02580D-1	CIRCUIT CARD ASSY, FIRST IF AMPLIFIER (For NHA, see fig. 35)	1	TB1601 (Sch. Figure 7-11)
1		D02984	COIL ASSY, RF	1	A1601
2	5C023104X0250B3	21706	CAPACITOR, FXD, CERAMIC, 0.1uf, ±20, 25VDC (72982)	4	C1601, C1602, C1603, C1605
3	1N281	35508	DIODE (03877)	1	CR1601
4	2N2996	30252	TRANSISTOR (01295)	1	Q1601
	N88001		INSULATOR, DISC (17069) (AP)	1	
5	RC07GF101J	10639	RESISTOR, FXD, COMP., 100, 1/4, 5%	2	R1601, R1602
6	RC07GF183J	10693	RESISTOR, FXD. COMP., 18K, 1/4, 5%	1	R1603
7	RC07GF472J	10679	RESISTOR, FXD. COMP., 4.7K, 1/4, 5%	1	R1604
8	RC07GF392J	10677	RESISTOR, FXD. COMP., 3.9K, 1/4, 5%	1	R1605
9	RC07GF471J	10655	RESISTOR, FXD. COMP., 470, 1/4, 5%	1	R1606
10	RC07GF102J	10663	RESISTOR, FXD. COMP., 1K, 1/4, 5%	1	R1607
11		C02897	PRINTED WIRING BOARD	1	

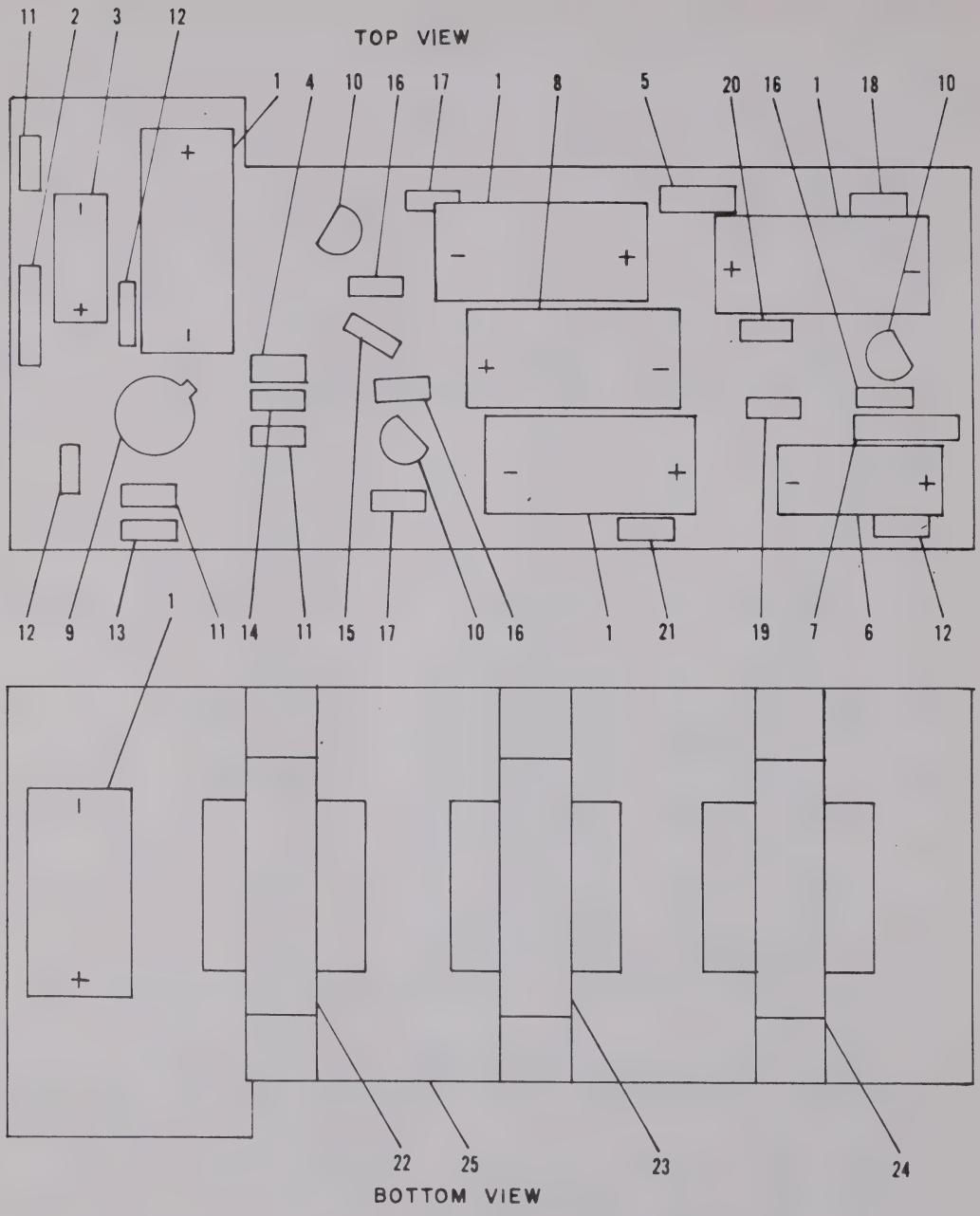


(Schematic 7-16)

Figure 37. Circuit Card Assembly, Emitter-Follower and Meter Zero

TB901

Fig. & Index No.	Part No. Mfg.	Part No. RCI	Description	Units Per Assy	Reference Designation
37-		A01774	CIRCUIT CARD ASSY, EMITTER-FOLLOWER AND METER ZERO, (For NHA, see fig. 34)	1	TB1901 (Sch. Figure 7-16)
1	5C023104X0250B3	21706	CAPACITOR, FXD, CERAMIC DISC, 0.1uf, ±20%, 25V (72982)	1	C1901
2	TE1204	24019	CAPACITOR, FXD, ELECTROLYTIC 10 uf, +100%, -20%, 25V (56289)	1	C1902
3	TE1209	24005	CAPACITOR, FXD, ELECTROLYTIC, 50 uf, +100%, -20%, 25V (56289)	1	C1903
4	2N3242	31251		1	Q1901
	N88001	70752	INSULATOR, DISC (17069) (AP)	1	
5	RC07GF104J	10711	RESISTOR, FXD COMP., 100K, 1/4W, ±5%	1	R1901
6	RC07GF103J	10687	RESISTOR, FXD COMP., 10K, 1/4W, ±5%	1	R1902
7	RC07GF223J	10695	RESISTOR, FXD COMP. 22K, 1/4W, ±5%	1	R1903
8	RC07GF562J	10681	RESISTOR, FXD COMP, 5.6K, 1/4W, ±5%	1	R1904
9	62PR50K	16014	RESISTOR, VARIABLE, 50K, 1/2W, ±20% (02681)	1	R1905
10	RC07GF181J	10645	RESISTOR, FXD COMP, 180 ohm, 1/4W, ±5%	1	R1906
11		B02905	PRINTED WIRING BOARD	1	

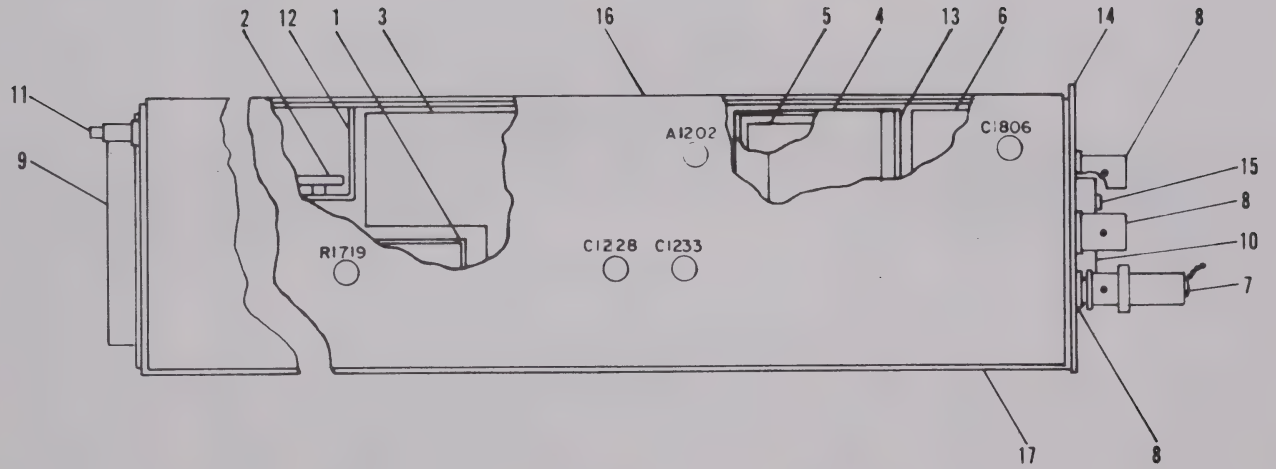


(Schematic 7-17)

Figure 38. Circuit Card Assembly, Amplifier Audio

A112

Fig. & Index No.	Part No. Mfg.	Part No. RCI	Description	Units Per Assy	Reference Designation
38-		D01502	CIRCUIT CARD ASSEMBLY, AMPLIFIER AUDIO (For NHA, see fig. 1)	1	A112 (Sch. Figure 7-16)
1	30D107G012CC0	24007	CAPACITOR, FXD, ALUMINUM ELECTROLYTIC 100uf, +100%, -20%, 15V (56289)	5	C1500, C1503, C1506, C1507 C1508
2	5C023104X0250B3	21706	CAPACITOR, FXD, CERAMIC DISC, 0.1uf, +20, 25V (72982)	1	C1501
3	30D205G012BA0	24008	CAPACITOR, FXD, ALUMINUM ELECTROLYTIC 2uf, +100, -20, 12V (56289)	1	C1502
4	K2R2J20K	25002	CAPACITOR, FXD, TANTALUM, 2.2uf, ±2,10V (05397)	1	C1504
5	DD-102G	21703	CAPACITOR, FXD CERAMIC DISC, 1000pf, ±2, 1000V (71590)	1	C1509
6	30D206G006BA0	24006	CAPACITOR, FXD, ALUMINUM ELECTROLYTIC 20uf, +75, -10, 6V (56289)	1	C1510
7	KR33J35KS	25016	CAPACITOR, FXD, TANTALUM, 0.33uf, ±10, 35V (05397)	1	C1511
8	30D506G025CC0	24005	CAPACITOR, FXD, ALUMINUM ELECTROLYTIC 50uf, +75,-10, 25V (56289)	1	C1512
9	2N2613	30001	TRANSISTOR (02735)	1	Q1500
10	2N3392	31250	TRANSISTOR (03508)	3	Q1501, Q1502, Q1503
11	RC07GF562J	10681	RESISTOR, FXD. COMP., 5.6K, 1/4W, 5%	3	R1500, R1503, R1505
12	RC07GF222J	10671	RESISTOR, FXD. COMP., 2.2K, 1/4W, 5%	3	R1501, R1502, R1517
13	RC07GF331J	10651	RESISTOR, FXD. COMP., 330, 1/4W, 5%	1	R1504
14	RC07GF223J	10695	RESISTOR, FXD. COMP., 22K, 1/4W, 5%	1	R1506
15	RC07GF153J	10691	RESISTOR, FXD. COMP., 15K, 1/4W, 5%	1	R1507
16	RC07GF154J	10715	RESISTOR, FXD. COMP., 150K, 1/4W, 5%	3	R1508, R1511, R1513
17	RC07GF471J	10655	RESISTOR, FXD. COMP., 470, 1/4W, 5%	2	R1509, R1510
18	RC07GF102J	10663	RESISTOR, FXD. COMP., 1K, 1/4W, 5%	1	R1512
19	RC07GF103J	10687	RESISTOR, FXD. COMP., 10K, 1/4W, 5%	1	R1514
20	RC07GF683J	10707	RESISTOR, FXD COMP., 68K, 1/4W, 5%	1	R1515
21	RC07GF680J	10635	RESISTOR, FXD. COMP., 68 1/4W, 5%	1	R1516
22		D02906	TRANSFORMER, AUDIO	1	T1500
23		D02908	TRANSFORMER, AUIDO	1	T1501
24		D02907	TRANSFORMER, AUDIO	1	T1502
25		B01503	PRINTED WIRING BOARD	1	



(Schematic 7-12)

Figure 39. IF Assembly A111

Fig. & Index No.	Part No. Mfg.	Part No. RCI	Description	Units Per Assy	Reference Designation
39-	RA6217A	A02029-1	IF ASSEMBLY (For NHA, see fig. 1)	1	A111 (G02028)
	RA6217A-3	A02029-2	IF ASSEMBLY (For NHA, see fig. 1)	1	A111 (G03327)
1		A02034-1	AMPLIFIER ASSY, 2ND, 3RD, and 4TH IF, (For details, see fig. 40)	1	A3001 (Sch. Figure 7-12)
		76400	SCREW, FH, 4-40, 3/16 in lg (AP)	2	
2		D01657	CIRCUIT CARD ASSY, AGC (For details, see fig. 42)	1	A3002 (Sch. Figure 7-13)
	MS35233-2	76001	SCREW, PH, 2-56, 3/16 in lg (AP)	3	
	5804-5-1	75110	WASHER, SPRING NO. 2 (86928) (AP)	3	
3		A01666	CIRCUIT CARD ASSY, DETECTOR (For details, see fig. 43)	1	A3003 (Sch. Figure 7-14)
	MS35233-2	76001	SCREW, PH, 2-56, 3/16 in lg (AP)	4	
	5804-5-1	75110	WASHER, SPRING, NO. 2 (AP)	4	
4		A02031	CIRCUIT CARD ASSY, FM INSERTION OSCILLATOR, FOR DETAILS, SEE FIG. 44	1	A3004 (Sch. Figure 7-17)
	MS35233-2	76001	SCREW, PH, 2-56, 3/16 in lg (AP)	3	
	5804-5-1	75110	WASHER, SPRING NO. 2 (AP	3	
5		A02026	CIRCUIT CARD ASSY, FM DISCRIMINATOR (For details, see fig. 45)	1	A3005 (Sch. Figure 7-18)
		SP03-017	STANDOFF (AP)	2	
	5804-5-1	75110	WASHER, SPRING NO. 2(AP)	2	
6		A03325	CIRCUIT CARD ASSY, 455-kHz CONVERTER (For details, see fig. 46)	1	A3006 (Sch. Figure 7-19)
		A03323	CIRCUIT CARD ASSY, 100-kHz CONVERTER (For details, see fig. 46	1	A3006 (Sch. Figure 7-20)
	MS35233-12	76011	SCREW, PH, 4-40, 3/16 in lg (AP)	3	
	5804-8-1	75112	WASHER, SPRING, NO. 4 (AP)	3	
7		B03290	CAP, TERMINATION, 75-ohm	1	AT3001
8	UG-1094/U	60002	CONNECTOR, RF (74868)	3	J3002, J3003, J3004
9	DCMFP37P	61015	CONNECTOR, RF (71785)	1	P3001
	MS35233-5	76004	SCREW, PH 2-56, 3/8 in lg (AP)	2	
		75203	NUT, 2-56 (AP)	2	
10	3-172Y		BLOCK, BARRIER, ELECTRICAL CONNECTOR (71785)	1	TB3001

Fig. & Index No.	Part No. Mfg.	Part No. RCI	Description	Units Per Assy	Reference Designation
39-10	MS35233-15	76014	SCREW, PH, 4-40, 3/16 in lg (AP)	4	
	MS35338-78	75002	WASHER, SPLIT, LOCK NO. 4 (AP)	4	
11		D01974-3	CABLE ASSY, RF	1	
12		B01766	PLATE, ELECTRONIC SHIELD	1	
		76400	SCREW, FH, 4-40, 3/16 in lg (AP)	3	
13		B01966	PLATE, ELECTRONIC SHIELD	1	
	MS35233-2	76001	SCREW, PH, 2-56, 3/16 in lg (AP)	2	
	MS35338-77	75001	WAHSER, SPLIT, LOCK NO. 2 (AP)	2	
14		B03286	PLATE, REAR COVER	1	
	MS35233-12	76011	SCREW, PH 4-40, 3/16 in lg (AP)	4	
	MS35338-78	75002	WASHER, SPLIT, LOCK, NO. 4 (AP)	4	
15		73150	LUG, JUMPER (75382)	1	
16		C01852	PLATE, COVER, 90-degree fold	1	
		76400	SCREW, FH, 4-40, 3/16 in lg (AP)	9	

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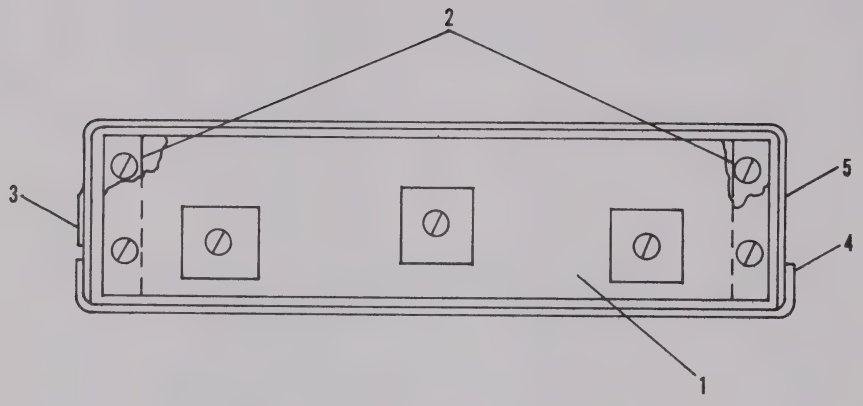
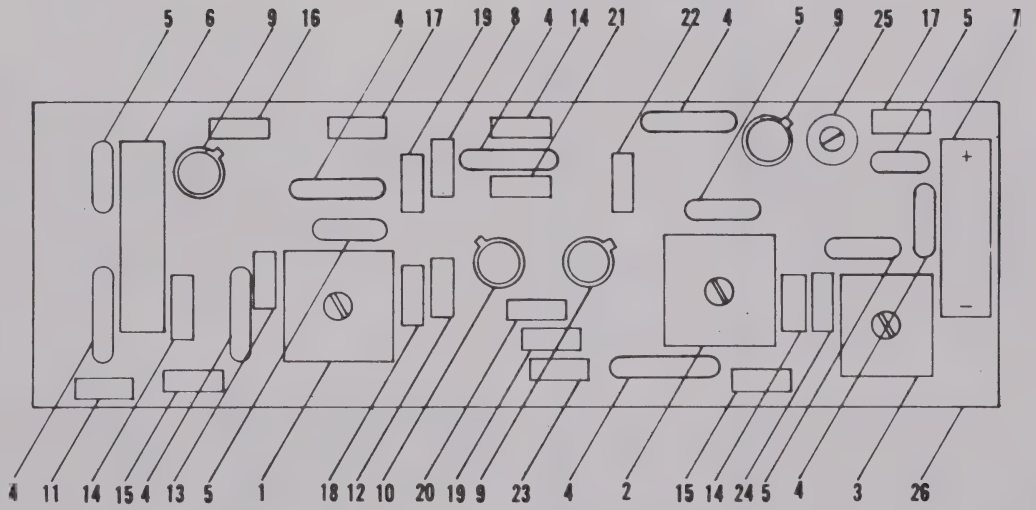


(Schematic 7-12, 7-13)

Figure 40. Amplifier Assembly, 2nd, 3rd, and 4th IF

A3001

Fig. & Index No.	Part No. Mfg.	Part No. RCI	Description	Units Per Assy	Reference Designation
40-		A02034-1	AMPLIFIER ASSY, 2ND, 3RD, and 4TH IF (For NHA, see fig. 1) (Sch. G01501)	1	A3001 (Sch. Figure 7-12,7-13)
1		A02837	CIRCUIT CARD ASSY, 2ND, 3RD, and 4TH IF AMPLIFIER (For details, see fig. 41)	1	TB1701
		79004	SCREW, PH (12360) (AP)	4	
	5804-5-1	75110	WASHER, SPRING (86928) (AP)	4	
2		B01483	BRACKET, END	2	
		79021	SCREW, PH (AP)	2	
3	MS35489-1	81150	GROMMET	1	
4		C02032	COVER, CHASSIS, IF AMPLIFIER	1	
	MS35233-12	76011	SCREW, PH (AP)	4	
	MS35338-78	75002	WASHER, SPLIT, LOCK (AP)	4	
5		02033	CHASSIS	1	

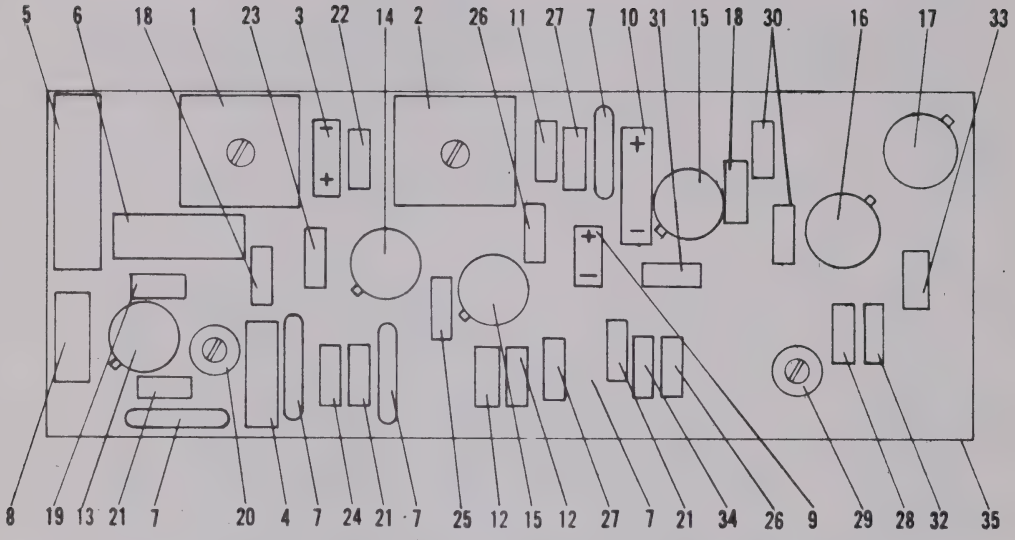


(Schematic 7-13)

Figure 41. Circuit Card Assembly, 2nd, 3rd, and 4th IF Amplifier

TB701

Fig. & Index No.	Part No. Mfg.	Part No. RCI	Description	Units Per Assy	Reference Designation
41-		A02837	CIRCUIT CARD ASSY, 2ND, 3RD, and 4TH IF AMPLIFIER (For NHA, see fig. 40) (Sch. G01501)	1	TB1701 (Sch. Figure 7-13)
1		D02936	COIL ASSY, RF	1	A1701
2		D02937	COIL ASSY, RF	1	A1702
3		D02938	COIL ASSY, RF	1	A1703
4	5C023104X0250B3	21706	CAPACITOR, FXD CERAMIC DISC, 0.1uf, +20, 25V (72982)	7	C1701, C1702, C1705, C1707, C1708, C1709, C1711
5			CAPACITOR, FXD, CERAMIC DISC, 0.02uf, +20, 25V (56289)	5	C1703, C1706, C1710, C1713 C1714
6	TE1204	24019	CAPACITOR, FXD, ELECTROLYTIC, 10uf, +100,-20, 25V (56289)	1	C1704
7	TE1209	24005	CAPACITOR, FXD, ELECTROLYTIC, 50uf, +100,-20, 25V (56289)	1	C1712
8	1N626	35507	DIODE (01295)	1	CR1701
9	2N3323	30251	TRANSISTOR (04713)	3	Q1701, Q1703, Q1704
	N88001	70752	INSULATOR, DISC (17069) (AP)	3	
10	2N722	31507	TRANSISTOR (01295)	1	Q1702
	N88001	70752	INSULATOR, DISC (17069) (AP)	1	
11	RC07GF151J	10643	RESISTOR, FXD. COMP., 150, 1/4W, 5%	1	R1701
12	RC07GF222J	10671	RESISTOR, FXD. COMP., 2.2K, 1/4W, 5%	1	R1702
13	RC07GF183J	10693	RESISTOR, FXD. COMP., 18K, 1/4W, 5%	1	R1703
14	RC07GF392J	10677	RESISTOR, FXD, COMP., 3.9K, 1/4W, 5%	3	R1704, R1712, R1716
15	RC07GF331J	10651	RESISTOR, FXD. COMP., 330, 1/4W, 5%	2	R1705, R1718
16	RC07GF470J	10631	RESISTOR, FXD. COMP., 47, 1/4W, 5%	1	R1706
17	RC07GF102J	10631	RESISTOR, FXD. COMP., 1K, 1/4W, 5%	2	R1707, R1720
18	RC07GF223J	10695	RESISTOR, FXD. COMP., 22K, 1/4W, 5%	1	R1708
19	RC07GF472J	10679	RESISTOR, FXD. COMP., 4.7K, 1/4W, 5%	2	R1709, R1710
20	RC07GF562J	10681	RESISTOR, FXD. COMP. 5.6K, 1/4W, 5%	1	R1711
21	RC07GF103J	10687	RESISTOR, FXD. COMP., 10K, 1/4W, 5%	1	R1713
22	RC07GF822J	10685	RESISTOR, FXD. COMP., 8.2K, 1/4W, 5%	1	R1714
23	RC07GF221J	10647	RESISTOR, FXD. COMP., 220, 1/4W, 5%	1	R1715
24	RC07GF123J	10689	RESISTOR, FXD. COMP., 12K, 1/4W, 5%	1	R1717
25	62PR2K	16019	RESISTOR, VARIABLE, 2000-ohm, 1/2W (02681)	1	R1719
26		D02055	PRINTED WIRING BOARD	1	



(Schematic 7-14)

Figure 42. Circuit Card Assembly, AGC

A3002

Fig. & Index No.	Part No. Mfg.	Part No. RCI	Description	Units Per Assy	Reference Designation
42-		D01657	CIRCUIT CARD ASSY, AGC (For NHA, see fig. 39)	1	A3002 (Sch. Figure 7-14)
1		D02037	COIL ASSY, RF	1	A1401
2		D02038	COIL ASSY, RF	1	A1402
3	SCM225FP020AC 2	25007	CAPACITOR, FXD, TANTALUM, 2.2uf, ±10, 20VDC (01295)	1	C1401
4	CM05F181JN3	22029	CAPACITOR, MICA, 180pf, (14655)	1	C1402
5	CM07F822JN3	22073	CAPACITOR, MICA 8200pf (14655)	1	C1403
6	CM06F152JN3	22053	CAPACITOR, MICA, 1500pf (14655)	1	C1404
7	5C023104X0250B3	21706	CAPACITOR, FXD, CERAMIC DISC., .1uf (72982)	5	C1405, C1407, C1408, C1410
8	CM05F331JN3	22036	CAPACITOR, MICA 330pf (14655)	1	C1406
9	SCM224FP035C2	25005	CAPACITOR, FXD, TANTALUM, .22uf, ±10, 35V (01295)	1	C1412
10	SCM106BP020C2	25004	CAPACITOR, FXD, TANTALUM, 10uf, ±10, 20VDC (01295)	1	C1413
11	1N659	35509	DIODE (01295)	1	CR1401
12	1N483B	35512	DIODE (03877)	2	CR1402, CR1403
13	2N2996	30252	TRANSISTOR (01295)	1	Q1401
	N88001		INSULATOR, DISC (17069) (AP)	1	
14	2N708	32000	TRANSISTOR (03877)	1	Q1402
	N88001		INSULATOR, DISC (17069) (AP)	1	
15	2N3242	31251	TRANSISTOR (02735)	2	Q1403, Q1404
	N88001		INSULATOR, DISC (17069) (AP)	2	
16	2N1309	30003	TRANSISTOR (01295)	1	Q1405
	69011-1058		INSULATOR, DISC	1	
17	2N1308	30753	TRANSISTOR, (93332)	1	Q1406
	69011-1058		INSULATOR, DISC	1	
18	RC07GF153J	10691	RESISTOR, FXD. COMP., 15K, 1/4W, 5%	2	R1401, R1421
19	RC07GF392J	10677	RESISTOR, FXD. COMP., 3.9K, 1/4W, 5%	1	R1402
20	62PR500	16025	RESISTOR, VARIABLE (02681), 500, +30, 1/2W	1	R1403
21	RC07GF102J	10663	RESISTOR, FXD. COMP., 1K, 1/4W, 5%	3	R1404, R1408, R1418
22	RC07GF331J	10651	RESISTOR, FXD. COMP., 330, 1/4W, 5%	1	R1405
23	RC07GF183J	10693	RESISTOR, FXD. COMP., 18K, 1/4W, 5%	1	R1406
24	RC07GF123J	10689	RESISTOR, FXD. COMP., 12K, 1/4@, 5%	1	R1407

Fig. & Index No.	Part No. Mfg.	Part No. RCI	Description	Units Per Assy	Reference Designation
42-25	RC07GF184J	10717	RESISTOR, FXD. COMP., 180k, 1/4W, 5%	1	R1410
26	RC07GF124J	10713	RESISTOR, FXD. COMP., 120K, 1/4W, 5%	2	R1411, R1417
27	RC07GF103J	10687	RESISTOR, FXD. COMP., 10K, 1/4W, 5%	2	R1412, R1413
28	RC07GF684J	10731	RESISTOR, FXD. COMP., 680K, 1/4W, 5%	1	R1414
29	62PR1MEG	16030	RESISTOR, VARIABLE, 1 MEG, 1/2W, ±30, (02681)	1	R1415
30	RC07GF682J	10683	RESISTOR, FXD. COMP., 6.8K, 1/4W, 5%	2	R1416, R1420
31	RC07GF222J	10671	RESISTOR, FXD. COMP., 2.2K, 1/4W, 5%	1	R1419
32	RN60D1331J	12001	RESISTOR, METAL FILM, 1330, 3/4W, 1%	1	R1422
33	RCP7GF332J	10675	RESISTOR, FXD COMP., 3.3K, 1/4W, 5%	1	R1423
34	51A2	19300	RESISTOR, THERMAL, 100K, (83186)	1	RT1401
35		D01537	PRINTED WIRING BOARD	1	

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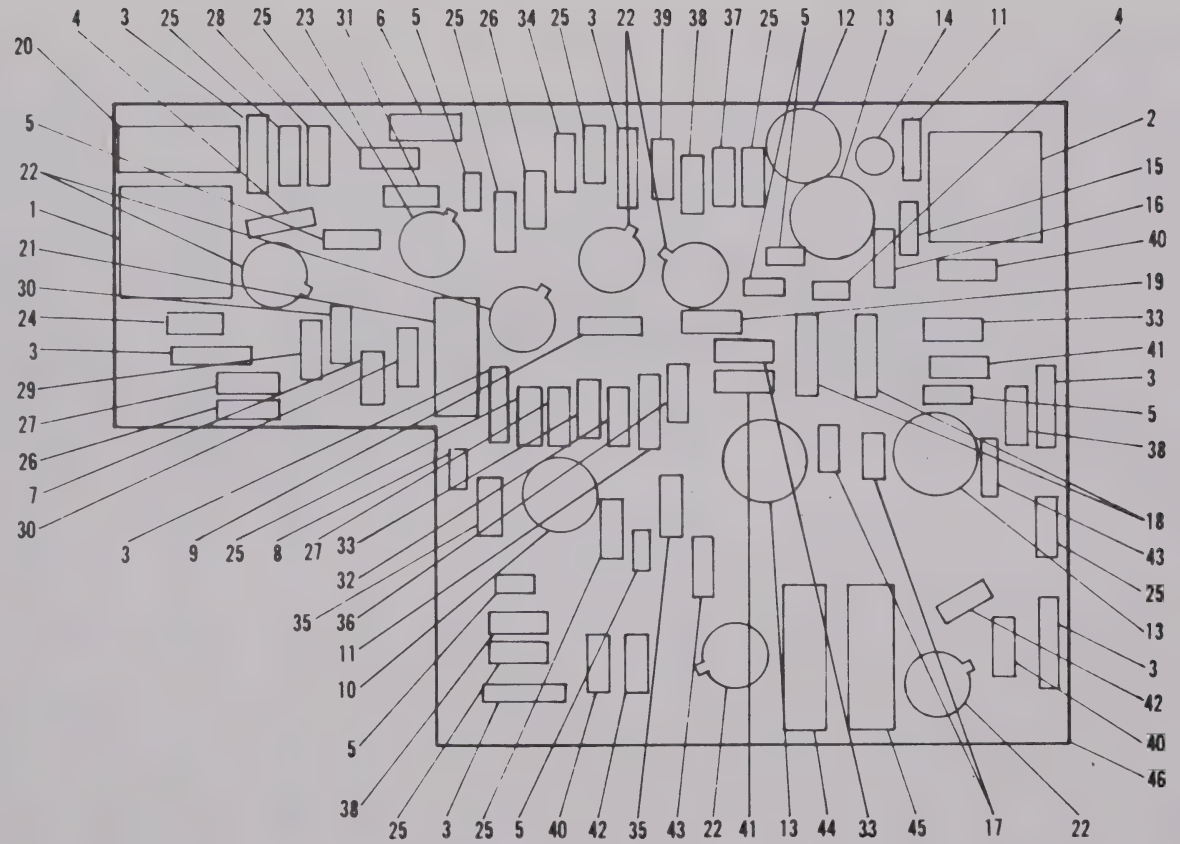

(Schematic 7-15)

Figure 43. Circuit Card Assembly, Detector

Fig. & Index No.	Part No. Mfg.	Part No. RCI	Description	Units Per Assy	Reference Designation
43-		A01666	CIRCUIT CARD ASSY, DETECTOR (For NHA, see fig. 39)	1	A3003, (Sch. Figure 7-15)
1		D02042	COIL ASSY, RF	1	A1201
2		D02043	COIL ASSY, RF	1	A1202
3	5C023104X0250B3	21706	CAPACITOR, FXD, CERAMIC DISC, 0.1uf, +20, 25V (72982)	7	C1201, C1203, C1209, C1212, C1224, C1226, C1235
4	CE102	21712	CAPACITOR, FXD, CERAMIC DISC, 0.001uf, +10, 500V (71590)	2	C1202, C1231
5	5835Y5U103Z	21704	CAPACITOR, FXD, CERAMIC, 0.01uf, +80, -20 25V (72982)	7	C1204, C1208, C1214, C1217 C1218, C1225, C1236
6	K33J10KS	25006	CAPACITOR, FXD, TANTALUM, 33uf, +10, 10V (05397)	1	C1205
7	CM05F101J03	22023	CAPACITOR, MICA 100pf, ±5, 500V (14655)	1	C1206
8	DD471	21711	CAPACITOR, FXD, CERAMIC DISC, 470pf, +10, 10000V (71590)	1	C1210
9	DD102G	21703	CAPACITOR, FXD, CERAMIC DISC, 0.001uf, +10, 1000V (71590)	1	C1211
10	K150J15S	25015	CAPACITOR, FXD, ELECTROLYTIC, 150uf, +20, 15V (05397)	1	C1213
11	CM05F131J03	22026	CAPACITOR, MICA 130pf, 5%, 500VDC (14655)	2	C1215, C1221
12	TE1207	24011	CAPACITOR, FXD, ELECTROLYTIC, 25uf, +150,-10, 25V (56289)	1	C1216
13	53800294RNJ50	28022	CAPACITOR, VARIABLE, 9-35pf, (72982)	3	C1219, C1228, C1233
14	31fU2J220JN750	21323	CAPACITOR, FXD, CERAMIC, TUBULAR, 22pf, ±5 (72982)	1	C1220
15	CM05E330J03	22010	CAPACITOR, MICA 33pf, 5%, 500VDC (14655)	1	C1222
16	VC399		CAPACITOR, VARICAP, 57-260pf, 100pf, at 4V ref (19373)	1	C1223
17	CM05F150JN3	22003	CAPACITOR, MICA, 15pf, 5%, 500VDC (14655)	2	C1227, C1234
18	CM05E221J03	22031	CAPACITOR, MICA, 220pf, 5% 500VDC (14655)	2	C1229, C1232

Fig. & Index No.	Part No. Mfg.	Part No. RCI	Description	Units Per Assy	Reference Designation
43-19	1N281	35508	DIODE, (03877)	1	CR1201
20		D02573	COIL, RF	1	L1201
21		D02994	COIL, RF	1	L1202
22	2N3323	30251	TRANSFORMER (04713)	6	Q1201, Q1203, Q1204, Q1205 Q1206, Q1207
	N88001	70752	INSULATOR, DISC (17069) (AP)	6	
23	2N2996	30252	TRANSISTOR (01295)	1	Q1202
	N88001	70752	INSULATOR, DISC (17069) (AP)	1	
24	RC07GF331J	10651	RESISTOR, FXD. COMP., 330, 1/4W, 5%	1	R1201
25	RC07GG102J	10663	RESISTOR, FXD. COMP., 1K, 1/4W, 5%	9	R1202, R1210, R1211, R1212, R1215, R1221, R1222, R1229, R1242
26	RC07GF392J	10677	RESISTOR, FXD. COMP., 3.9K, 1/4W, 5%	2	R1203, R1213
27	RC07GF183J	10693	RESISTOR, FXD. COMP., 18K, 1/4W, 5%	2	R1204, R1214
28	RC07GF560J	10633	RESISTOR, FXD. COMP. 56, 1/4W, 5%	1	R1205
29	RC07GF821J	10661	RESISTOR, FXD. COMP. 820, 1/4W, 5%	1	R1206
30	RC07GF103J	10687	RESISTOR, FXD. COMP. 10K, 1/4W, 5%	2	R1207, R1208
31	RC07GF330J	10627	RESISTOR, FXD. COMP. 33, 1/4W, 5%	1	R1209
32	RC07GF152J	10667	RESISTOR, FXD. COMP. 1.5K, 1/4W, 5%	1	R1216
33	RC07GF123J	10689	RESISTOR, FXD. COMP. 12K, 1/4W, 5%	3	R1217, R1236, R1237
34	RC07GF222J	10671	RESISTOR, FXD. COMP. 2.2K, 1/4W, 5%	1	R1218
35	RC07GF271J	10649	RESISTOR, FXD. COMP. 270, 1/4W, 5%	2	R1219, R1223
36	RC07GF681J	10659	RESISTOR, FXD. COMP. 680, 1/4W, 5%	1	R1224
37	RC07GF332J	10675	RESISTOR, FXD. COMP. 3.3K, 1/4W, 5%	1	R1225
38	RC07GF223J	10695	RESISTOR, FXD. COMP. 22K, 1/4W, 5%	3	R1226, R1231, R1241
39	RC07GF272J	10673	RESISTOR, FXD. COMP. 2.7K, 1/4W, 5%	1	R1227
40	RC07GF472J	10679	RESISTOR, FXD COMP. 4.7K, 1/4W, 5%	3	R1228, R1234, R1240
41	RC07GF101J	10639	RESISTOR, FXD. COMP. 100, 1/4W, 5%	2	R1232, R1243
42	RC07GF391J	10653	RESISTOR, FXD. COMP. 390, 1/4W, 5%	2	R1233, R1239
43	RC07GF683J	10707	RESISTOR, FXD. COMP. 68K, 1/4W, 5%	2	R1235, R1238
44		B02040	CRYSTAL, CR-18/U, 1.5985 MHz	1	Y1201
45		B02041	CRYSTAL, CR-18/U, 1.6015 MHz	1	Y1202
46		D02883	PRINTED WIRING BOARD	1	

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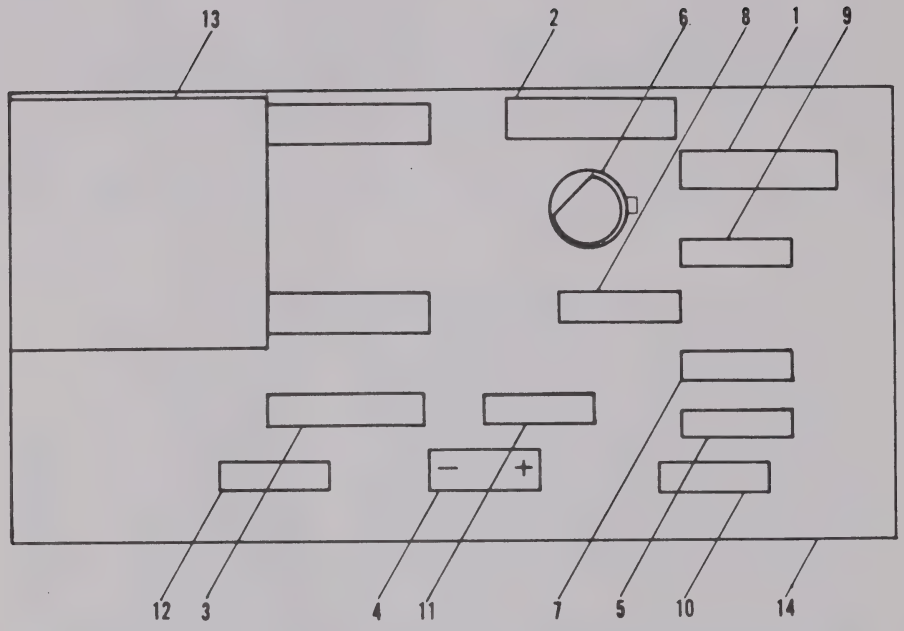
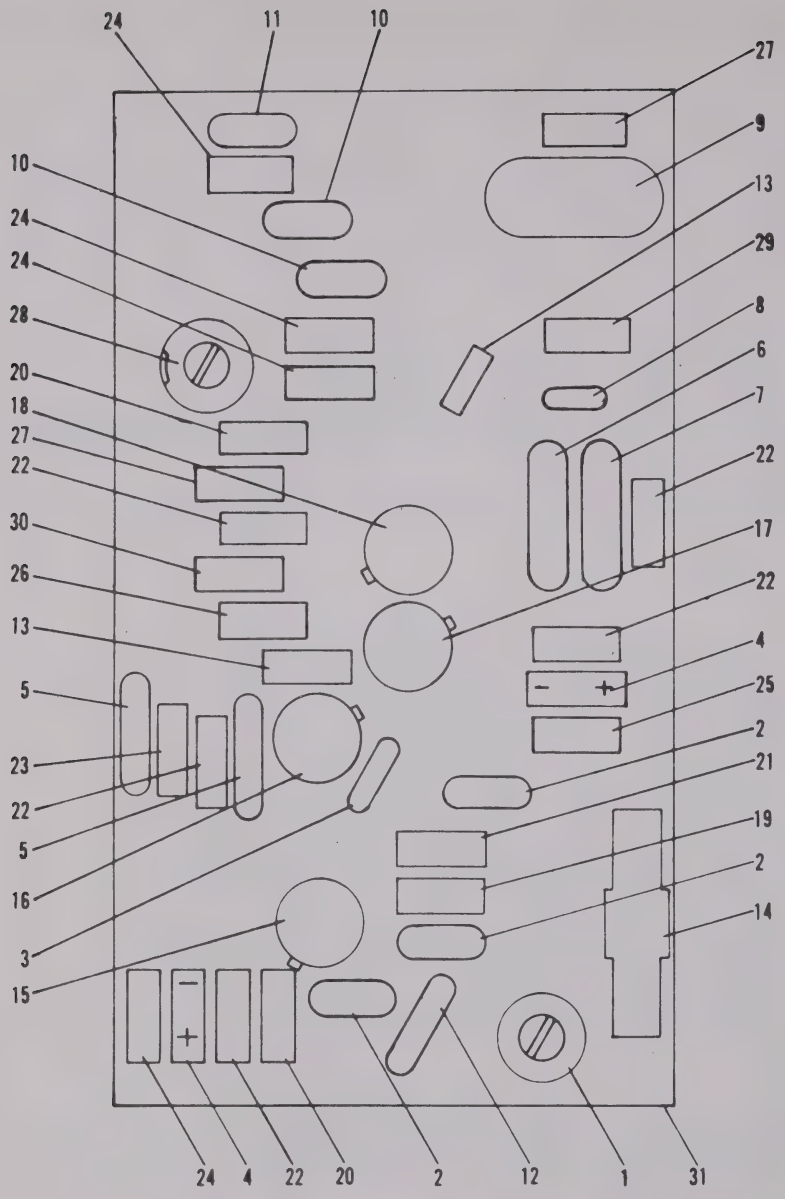


(Schematic 7-18)

Figure 44. Circuit Card Assembly, FM Insertion Oscillator

Fig. & Index No.	Part No. Mfg.	Part No. RCI	Description	Units Per Assy	Reference Designation
44-		A02031	CIRCUIT CARD ASSY, FM INSERTION OSCILLATOR (For NHA, see fig. 39)	1	A3004 (Sch. Figure 7-18)
1	CM05F221J03	22031	CAPACITOR, MICA, 220pf, ±5, 500VDC (14655)	1	C3101
2	CM05C300J03	26826	CAPACITOR, MICA, 30pf, ±5, 500VDC	1	C3102
3	5C023104X0250B3	21706	CAPACITOR, FXD. CERAMIC, 0.1uf, ±20, 25V (72982)	1	C3103
4	K2R2J20KS	25002	CAPACITOR, FXD, TANTALUM, 2.2uf, ±10, 20V (05397)	1	C3104
5	1N281	35508	DIODE (03877)	1	CR3101
6	2N3323	30251	TRANSISTOR (04713)	1	Q3101
	N88001		INSULATOR, DISC (17069) (AP)	1	
7	RC07GF123J	10689	RESISTOR, FXD. COMP., 12K, 1/4W, 5%	1	R3101
8	RC07GF683J	10707	RESISTOR, FXD. COMP., 68K, 1/4W, 5%	1	R3102
9	RC07GF391J	10653	RESISTOR, FXD. COMP., 390, 1/4W, 5%	1	R3103
10	RC07GF472J	10679	RESISTOR, FXD. COMP., 4.7K, 1/4W, 5%	1	R3104
11	RC07GF223J	10695	RESISTOR, FXD. COMP., 22K, 1/4W, 5%	1	R3105
12	RC07GF102J	10663	RESISTOR, FXD. COMP., 1K, 1/4W, 5%	1	R3106
13		B02039	CRYSTAL, QUARTZ, CR-18/U, 1720 kHz	1	Y3101
14		C01686	PRINTED WIRING BOARD	1	



(Schematic 7-19)

Figure 45. Circuit Card Assembly, FM Discriminator

A3005

Fig. & Index No.	Part No. Mfg.	Part No. RCI	Description	Units Per Assy	Reference Designation
45-		A02026	CIRCUIT CARD ASSY, FM DISCRIMINATOR (For NHA, see fig. 39)	1	A3005 (Sch. Figure 7-19)
1	N-7500	28021	CAPACITOR, VARIABLE, CERAMIC, 7-35 pf	1	C2901
2	CE102	21712	CAPACITOR, FXD, CERAMIC DISC. 0.001 uf, ±10%, 500V (71590)	3	C2902, C2903, C2906
3	TGD50	21713	CAPACITOR, FXD, CERAMIC DISC, 0.oo5 uf, ±20%, 50V (56289)	1	C2904
4	SCM225FP020C2	25007	CAPACITOR, FXD, TANTALUM, 2.2 uf, ±10% 20 V (01295)	2	C2905, C2908
5	5C034104X0250B3	21706	CAPACITOR, FXD, CERAMIC, 0.1 uf, ±20% 25V (56289)	2	C2907, C2909
6	CM05F331J03	22036	CAPACITOR, MICA, 330 pf, ±5%, 500 VDC (14655)	1	C2910
7	CM05D121J03	22025	CAPACITOR, MICA, 120 pf, ±5%, 500 VDC (14655)	1	C2911
8	5835000YU2 03M	21713	CAPACITOR, FXD, CERAMIC, 0.02 uf, ±20%, 25V (72982)	1	C2912
9	CM06F222J03	22057	CAPACITOR, MICA, 2200 pf, ±5%, 500 VDC (14655)	1	C2913
10	DD821	21714	CAPACITOR, FXD, CERAMIC DISC, 820 pf, ±10%, 500 V (71590)	2	C2914, C2915
11	DD751	21715	CAPACITOR, FXD-CERAMIC DISC, 750 pf, ±10%, 500V (71590)	1	C2916
12	CM05E270J03	22008	CAPACITOR, MICA, 27 pf, ±5%, 500 VDC (14655)	1	C2917
13	1N914	35510	DIODE, (01295)		CR2901, CR2902
14		A04624	COIL, RF	1	L2901
15	2N3323	30251	TRANSISTOR (04713)	1	Q2901
	N88001	70752	INSULATOR, DISC (17069) (AP)	1	
16	2N705	31000	TRANSISTOR (01295)	1	Q2902
	N88001	70752	INSULATOR, DISC (17069) (AP)	1	
17	TN60	32250	TRANSISTOR (56289)	1	Q2903
	N88001	70752	INSULATOR, DISC (17069) (AP)	1	Q2903
18	TN62	32251	TRANSISTOR, (56289)	1	Q2904
	N88001	70752	INSULATOR, DISC (17069) (AP)	1	

Fig. & Index No.	Part No. Mfg.	Part No. RCI	Description	Units Per Assy	Reference Designation
45-19	RC07GF683J	10707	RESISTOR, FXD, COMP., 68K, 1/4W, ±5%	1	R2901
20	RC07GF103J	10687	RESISTOR, FXD, COMP., 10K, 1/4W, ±5%	2	R2902, R2914
21	RC07GF622J	10682	RESISTOR, FXD, COMP., 6.2K, 1/4W, ±5%	1	R2903
22	RC07GF102J	10663	RESISTOR, FXD, COMP., 1K, 1/4W, ±5%	5	R2904, R2907, R2909, R2911 R2915
23	RC07GF272J	10697	RESISTOR, FXD COMP., 27K, 1/4W, ±5%	1	R2905
24	RC07GF472J	10679	RESISTOR, FXD COMP., 4.7K, 1/4W, ±5%	4	R2906, R2918, R2919, R2920
25	RC07GF201J	10646	RESISTOR, FXD COMP. 200 ohm, 1/4W, ±5%	1	R2908
26	RC07GF223J	10695	RESISTOR, FXD COMP., 22K, 1/4W, ±5%	1	R2910
27	RC07GF153J	10691	RESISTOR, FXD COMP., 15K, 1/4W, ±5%	2	R2912, R2917
28	62PR10K	16023	RESISTOR, VARIABLE, 10,000 ohm 1/4W (02681)	1	R2913
29	RC07GF511J	10656	RESISTOR, FXD COMP., 510 ohm, 1/4W, ±5%	1	R2916
30	1N748	33526	DIODE (01295) ZENER	1	VR2901
31		D01689	PRINTED WIRING BOARD	1	

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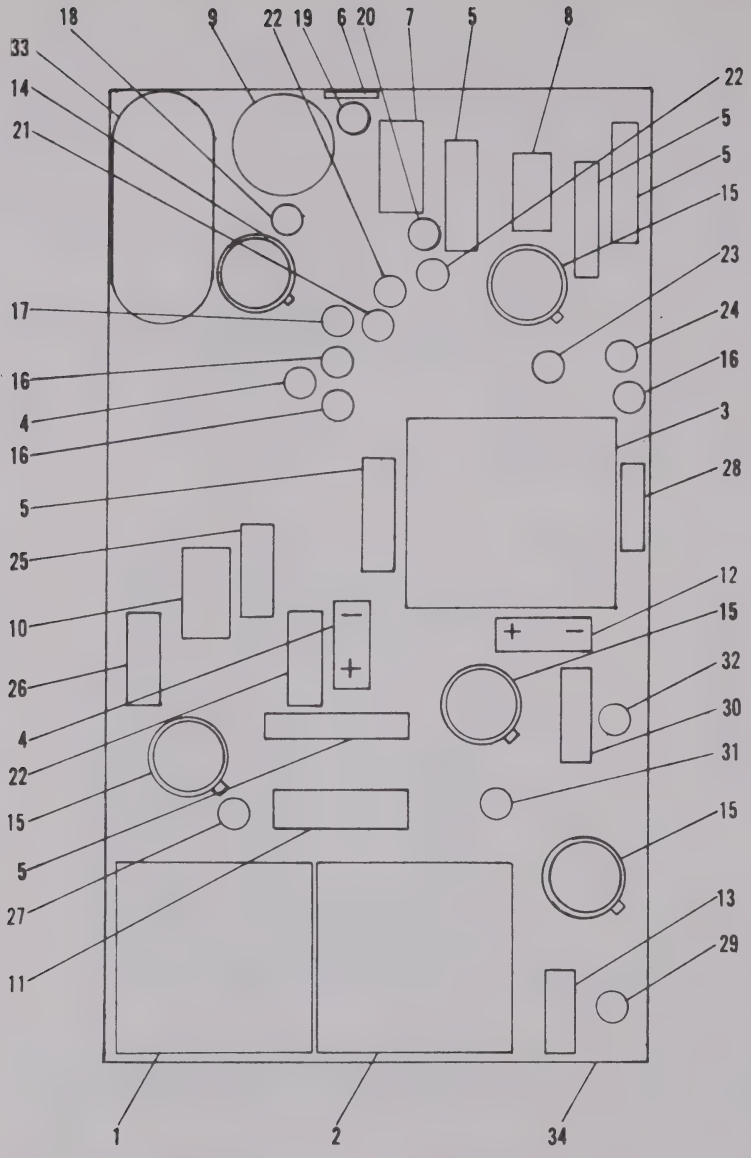


46 a (Schematic 7-20, 455 kHz Converter)
46 b (Schematic 7-21, 100 kHz Converter)

Circuit Card Assembly

A3006

Fig. & Index No.	Part No. Mfg.	Part No. RCI	Description	Units Per Assy	Reference Designation
46a-	Used RA6217A	A03325	CIRCUIT CARD ASSY, 455 kHz CONVERTER (For NHA, see fig. 39)	1	A3306 (Sch. Figure 7-20)
1		D03328	COIL ASSY, RF	1	A1801
2		D03329	COIL ASSY, RF	1	A1802
3		D03330	COIL ASSY, RF	1	A1803
4	5CM564FP035-C2	25508	CAPACITOR, TANTALUM, .56 uf, ±10% 35 VDC (01295)	2	C1801, C1813
5	5C023104X0250B3	21706	CAPACITOR, FXD, CERAMIC, 0.1 uf, ±20% 25V (72982)	5	C1802, C1809, C1811, C1812 C1810
6	CD6C120J500	22303	CAPACITOR, FXD, MICA, 12 pf, ±5%, 500V (14655)	1	C1803
7	CM05F151J03	26828	CAPACITOR, FXD, MICA, 150 pf ±5%, 500 VDC	1	C1804
8	CK60AW102M	21702	CAPACITOR, .001 uf, ±20%, 100 VDC (72982)	1	C1805
9		28021	CAPACITOR, VARIABLE, CERAMIC, 7-35 pf	1	C1806
10	CE471	21716	CAPACITOR, FXD, CERAMIC, 470 pf, ±10% 500 V, (71590)	1	C1808
11	CM05E180JN3	22004	CAPACITOR, FXD, MICA 18 pf, ±5% 500 VDC	1	C1815
12	CS13BE225K	25002	CAPACITOR, TANTALUM, 2.2 uf, ±10%, 20 VDC	1	C1817
13	5835-Y5U-103Z	21074	CAPACITOR, FXD, CERAMIC, 0.01 uf, ±80% -20%, 25V (79282)	1	C1818
14	2N3323	30251	TRANSISTOR (04713)	1	Q1801
	N88001	70752	INSULATOR, DISC (17069) (AP)	1	
15	2N3242	31251	TRANSISTOR (04713)	4	Q1802, Q1803, Q1804, Q1805
	N88001	70752	INSULATOR, DISC (17069) (AP)	4	
16	RC07GF101J	10639	RESISTOR, FXD, COMP, 100 ohm 1/4W +5%	3	R1801, R1809, R1812
17	RC07GF683J	10707	RESISTOR, FXD, COMP, 68K, 1/4W, +5%	1	R1802
18	RC07GF391J	10653	RESISTOR, FXD, COMP, 390 ohm, 1/4W, +5%	1	R1803
19	RC07GF472J	10679	RESISTOR, FXD, COMP, 4.7K, 1/4W, +5%	1	R1804
20	RC07GF682J	10683	RESISTOR, FXD, COMP, 6.8K, 1/4W, +5%	1	R1805
21	RC07GF223J	10695	RESISTOR, FXD, COMP, 22K, 1/4W, +5%	1	R1806
22	RC07GF102J	10663	RESISTOR, FXD, COMP, 1K, 1/4W, ±5%	3	R1807, R1811, R1815

Fig. & Index No.	Part No. Mfg.	Part No. RCI	Description	Units Per Assy	Reference Designation
46b-	Used RA6217A	A03325	CIRCUIT CARD ASSY, 100 kHz CONVERTER (For NHA, see fig. 39)	1	A3006 (Sch. Figure 7-21)
1		D03780	COIL ASSY, RF	1	A1801
2		D03781	COIL ASSY, RF	1	A1802
3		D03782	COIL ASSY, RF	1	A1803
4	5CM564FP035-C2	25508	CAPACITOR, TANTALUM, .56 uf, ±10% 35 VDC, (01295)	2	C1801, C1813
5	5815Y5U104M	21730	CAPACITOR, FXD, CERAMIC, 0.1 uf, ±20%, 25V (72982)	5	C1802, C1809, C1811, C1812 C1810
6	CD6C120J500	22303	CAPACITOR, FXD, MICA, 12 pf, ±5%, 500V (14655)	1	C1803
7	CM05F151J03	26828	CAPACITOR, FXD, MICA, 150 pf ±5%, 500 VDC	1	C1804
8	CK60AW102M	21702	CAPACITOR, .001 uf, ±20%, 1000 VDC, (72982)	1	C1805
9		28021	CAPACITOR, VARIABLE, CERAMIC, 7-35 pf	1	C1806
10	CE471	21716	CAPACITOR, FXD, CERAMIC, 470 pf, ±10% 500V, (71590)	1	C1808
11	CM05E101JN3	22023	CAPACITOR, FXD, MICA, 100 pf, ±5%, 500 VDC	1	C1815
12	CS13BE225K	25002	CAPACITOR, TANTALUM, 2.2 uf, ±10%, 20 VDC	1	C1817
13	5835-Y5U-103Z	21074	CAPACITOR, FXD, CERAMIC, 0.01 uf, +80% -20%, 25V (79282)	1	C1818
14	2N3323	32051	TRANSISTOR (04713)	1	Q1801
	N88001	70752	INSULATOR, DISC (17069) (AP)	1	
15	2N3242	31251	TRANSISTOR (04713)	4	Q1802, Q1803, Q1804, Q1805
	N88001	70752	INSULATOR, DISC (17069) (AP)	4	
16	RC07GF101J	10639	RESISTOR, FXD, COMP, 100 ohm 1/4W ±5%	3	R1801, R1809, R1812
17	RC07GF683J	10707	RESISTOR, FXD, COMP. 68K, 1/4W, ±5%	1	R1802
18	RC07GF391J	10653	RESISTOR, FXD, COMP. 390 ohm, 1/4W, ±5%	1	R1803
19	RC07GF472J	10679	RESISTOR, FXD, COMP. 4.7K, 1/4W, ±5%	1	R1804
20	RC07GF682J	10683	RESISTOR, FXD, COMP, 6.8K, 1/4W, ±5%	1	R1805
21	RC07GF223J	10659	RESISTOR, FXD, COMP, 22K, 1/4W, ±5%	1	R1806
22	RC07GF102J	10663	RESISTOR, FXD, COMP, 1K, 1/4W, ±5%	3	R1807, R1811, R1815

Fig. & Index No.	Part No. Mfg.	Part No. RCI	Description	Units Per Assy	Reference Designation
46b-23	RC07GF182J	10669	RESISTOR, FXD, COMP, 1.8K, 1/4W, ±5%	1	R1808
24	RC07GF271J	10649	RESISTOR, FXD, COMP, 270, 1/4W, ±5%	1	R1810
25	RC07GF332J	10675	RESISTOR, FXD, COMP, 3.3K, 1/4W, ±5%	1	R1813
26	RC07GF183J	10693	RESISTOR, FXD, COMP, 18K, 1/4W, ±5%	1	R1814
27	RC07GF100J	10615	RESISTOR, FXD, COMP, 10 ohm, 1/4W, ±5%	1	R1816
28	RC07GF911J	10662	RESISTOR, FXD, COMP, 910 ohm, 1/4W, ±5%	1	R1818
29	RC07GF101J	10639	RESISTOR, FXD, COMP, 100 ohm, 1/4W ±5%	1	R1819
30	RC07GF122J	10665	RESISTOR, FXD, COMP, 1.2K, 1/4W, ±5%	1	R1820
31	RC07GF153J	10691	RESISTOR, FXD, COMP, 16K, 1/4W, ±5%	1	R1821
32	RC07GF121J	10641	RESISTOR, FXD, COMP, 120 ohm, 1/4W, ±5%	1	R1822
33	CR-18A/U	37009	CRYSTAL, QUARTZ, 1.5 MHz	1	Y1801
34		D04004	PRINTED WIRING BOARD		

Fig. & Index No.	Part No. Mfg.	Part No. RCI	Description	Units Per Assy	Reference Designation
46a-23	RC07GF182J	10669	RESISTOR, FXD, COMP, 1.8K, 1/4W, ±5%	1	R1808
24	RC07GF271J	10649	RESISTOR, FXD, COMP, 270, 1/4W, ±5%	1	R1810
25	RC07GF332J	10675	RESISTOR, FXD, COMP, 3.3K, 1/4W, ±5%	1	R1813
26	RC07GF183J	10693	RESISTOR, FXD, COMP, 18K, 1/4W, ±5%	1	R1814
27	RC07GF100J	10615	RESISTOR, FXD, COMP, 10 ohm, 1/4W, ±5%	1	R1816
28	RC07GF101J	10639	RESISTOR, FXD, COMP, 100 ohm 1/4W, ±5%	1	R1818
29	RC07GF151J	10643	RESISTOR, FXD, COMP, 150 ohm, 1/4W, 5%	1	R1819
30	RC07GF122J	10665	RESISTOR, FXD, COMP, 1.2K, 1/4W, ±5%	1	R1820
31	RC07GF153J	10691	RESISTOR, FXD, COMP, 15K, 1/4W, ±5%	1	R1821
32	RC07GF121J	10641	RESISTOR, FXD, COMP, 120 ohm, 1/4W, ±5%	1	R1822
33	CR-18A/U	37006	CRYSTAL, QUARTZ, 1.145 MHz	1	Y1801
34		D04004	PRINTED WIRING BOARD	1	

Fig. & Index No.	Part No.		Description	Units Per Assy	Reference Designation
	Mfg.	RCI			
47-	NOT USED				

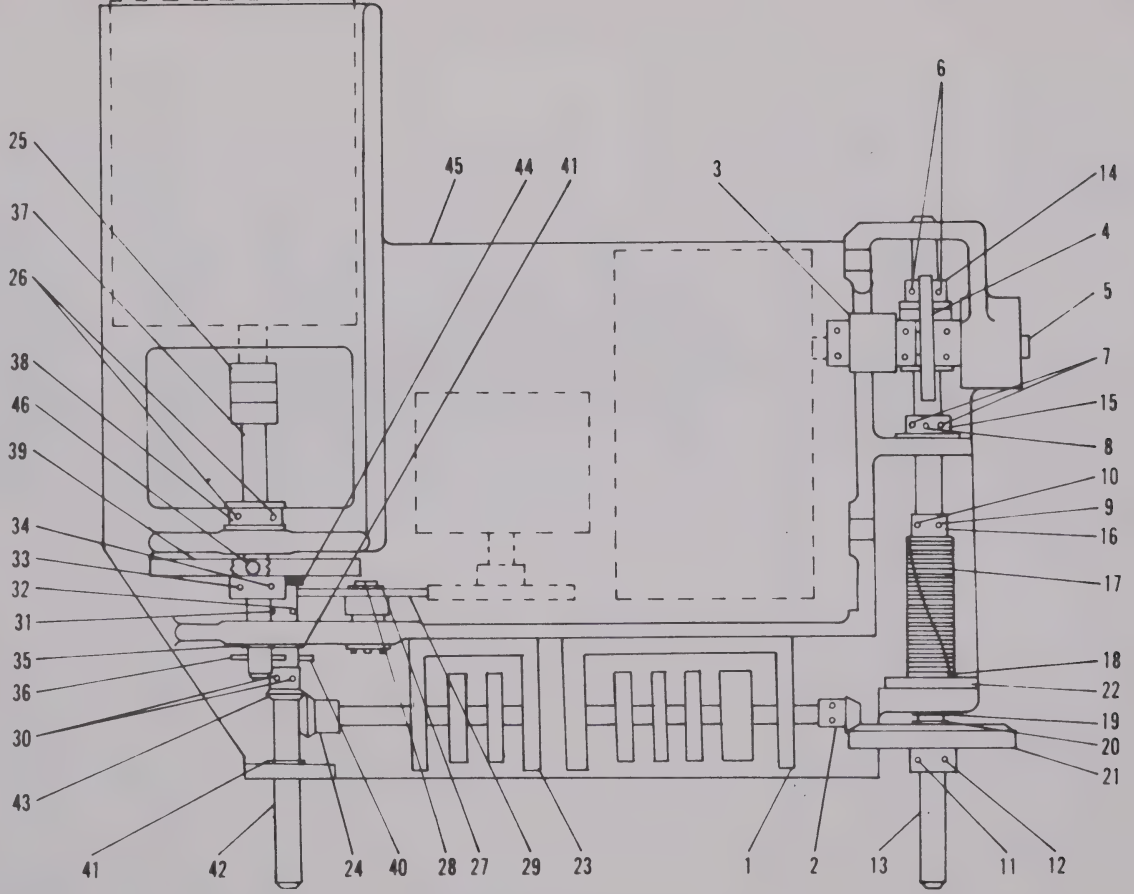


Figure 48. Gear Train Assembly

Fig. & Index No.	Part No. Mfg.	Part No. RCI	Description	Units Per Assy	Reference Designation
48-		A03995-1	GEAR TRAIN ASSEMBLY (For NHA, see fig. 1)	1	
1		C02865	COUNTER, kHz	1	
	MS35233-27		SCREW, PH, 6-32, 5/16 in lg (AP)	4	
2		C03974	GEAR, BEVEL	1	
		81987	CLAMP, 4-40, 1/8 in lg (AP)	2	
3		B02412	COUPLER, SHAFT, BELLOWS (99934)	1	
		77419	SCREW, SET, HEX SOCKET, CONE POINT, 6-32, 1/8 in lg (AP)	2	
		77019	SCREW, SET, HEX SOCKET, CUP POINT, 6-32 1/8 in lg (AP)	2	
4		A03972	GEAR, SPRING LOADED	1	
		77009	SCREW, SET, HEX SOCKET, CUP POINT, 4-40, 1/8 in lg (AP)	2	
5		B02289	SHAFT, SECOND VFO, NO. 2	1	
	3100-25	75116	RING, RETAINER (AP)	1	
	5720-21	75110	WASHER	1	
6		77009	SCREW, SET, HEX SOCKET, CUP POINT, 4-40, 1/8 in lg	2	
7		77409	SCREW, SET, HEX SOCKET, CONE POINT, 4-40, 1/8 in lg	2	
8		81367	PIN, ROLL, 1/16 in dia, 5/8 in lg	1	
9		81359	PIN, ROLL, 1/16 in ida, 1/2 in lg	1	
10		77009	SCREW, SET, HEX SOCKET, CUP POINT, 4-40, 1/18 in lg	1	
11		81359	PIN, ROLL, 1/16 in ida, 1/2 in lg	1	
12		77020	SCREW, SET, HEX SOCKET, CUP POINT, 6-32 5/32 in lg	1	
13		B02288	SHAFT, SECOND VFO, NO. 1	1	
14		B03973	GEAR, WORM	1	
15		B02521	COLLAR, SHAFT	1	
16		B02318	COLLAR, STOP	1	
17		B02319	WASHER, STOP	23	
18	5710-54-62	75122	WASHER, PLAIN	1	
19	5710-54-62	75122	WASHER, BRASS	1	

Fig. & Index No.	Part No. Mfg.	Part No. RCI	Description	Units Per Assy	Reference Designation
48-20	MS35338-79		RING, RETAINER	1	
21		C03975	GEAR, BEVEL	1	
22		B02308	PLATE, STOP	1	
	MS35233-29		SCREW, PH, 6-32, 7/16 in lg (AP)	2	
	MS35338-79		WASHER, SPLIT, LOCK (AP)	2	
23		C02864	COUNTER, MHz	1	
	MS35233-27	76026	SCREW, PH, 6-32, 5/16 in lg (AP)	2	
	MS35538-79		WASHER, SPLIT, LOCK (AP)	2	
24		C03976-1	GEAR, BEVEL	1	
		77009	SCREW, SET, HEX SOCKET, CUP POINT, 4-40, 1/8 in lg (AP)	2	
25	A201-5	81610	COUPLING, FLEXIBLE, INSULATED (99934)	1	
		77419	SCREW, SET, HEX SOCKET, CONE POINT, 6-32, 1/8 in lg (AP)	2	
		77019	SCREW, SET, HEX SOCKET, CUP POINT, 6-32, 1/8 in lg (AP)	2	
26		77011	SCREW, SET, HEX SOCKET, CUP POINT, 4-40. 3/16 in lg	2	
27	3100-25	75116	RING, RETAINER	1	
28		A03470	SHAFT, IDLER	1	
	MS35233-13	76012	SCREW, PH, 4-40, 1/4 in lg (AP)	3	
	MS35338-78	75002	WASHER, SPLIT, LOCK (AP)	3	
29	G13-70	81651	GEAR, SPUR (00141)	1	
30		77009	SCREW, SET, HEX SOCKET, CUP POINT, 4-40,1/8 in lg	2	
31		81359	PIN, ROLL, 1/16 in dia, 1/2 in lg	1	
32		77020	SCREW, SET, HEX SOCKET, CUP POINT, 6-32, 5/32 in lg	1	
33		81367	PIN, ROLL, 1/16 in dia, 5/8 in lg	1	
34		77011	SCREW, SET, HEX SOCKET, CUP POINT, 4-40, 3/16 in lg	1	
35	3100-25	75116	RING, RETAINER	1	
36		81366	PIN, ROLL, 3/32 in ida, 13/16 in lg	1	
37		B02521	SHAFT, FIRST VFO	1	
38		B03909	ARM, CAM	1	

Fig. & Index No.	Part No.		Description	Units Per Assy	Reference Designation
	Mfg.	RCI			
48-39		C02851	GEAR, INTERNAL, TOOTH	1	
40		81366	PIN, ROLL, 3/32 in ida, 13/16 in lg	1	
41	3100-25	75116	RING, RETAINER	2	
42		B01985	SHAFT, GEAR	1	
43		C03976-2	GEAR, BEVEL	1	
44	G14-30	81650	GEAR, SPUR	1	
45		E03014	FRAME, GEAR TRAIN ASSEMBLY (01226)		

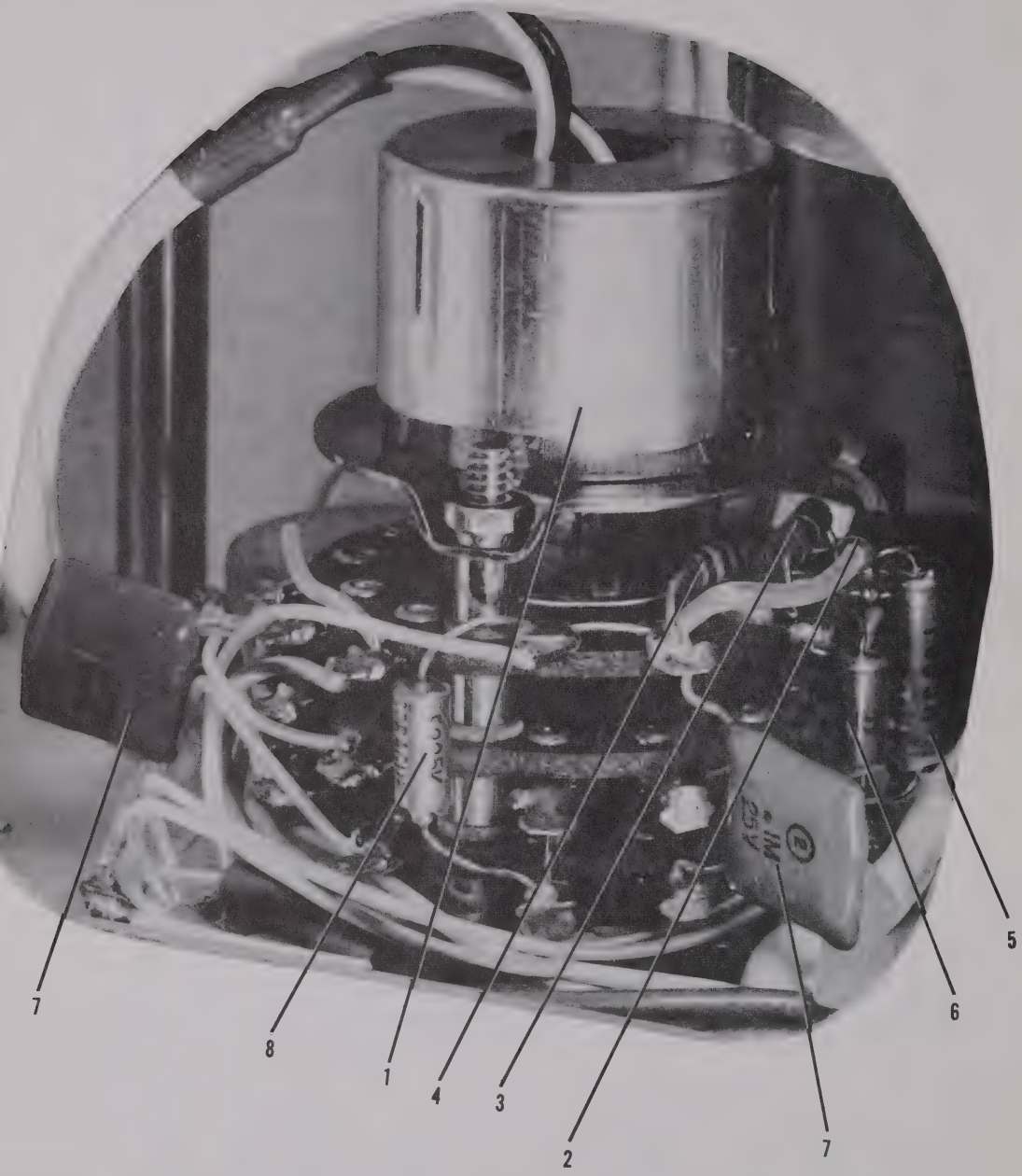


Figure 49. AGC Assembly

Fig. & Index No.	Part No. Mfg.	Part No. RCI	Description	Units Per Assy	Reference Designation
49-		C01742	SWITCH, ROTARY	1	S105, S106, (Sch 7-1)
1		C01742	SWITCH, ROTARY	1	S105, S106
2	RC07GF155J	10739	RESISTOR, COMP, 1.5 MEG 1/4W 5%	1	R110
3	RC07GF124J	10713	RESISTOR, COMP, 120K 1/4W	1	R108
4	RC07GF683J	10707	RESISTOR, COMP, 68K 1/4W	1	R107
5	K6R8J35KS	25011	CAPACITOR, FXD, TANTALUM, 6.8 uf ±10 pct. 35V (05397)	1	C108
6	KR47J35KS	25003	CAPACITOR, FXD, TANTALUM, 0.47 uf ±10 pct. 35V (05397)	1	C107
7	5C023104X0250B3	21706	CAPACITOR, FXD, CERAMIC DISC, 0.1uf ±20, 25V (56289)	2	C106, C109
8	K2R2J20KS	25002	CAPACITOR, FXD, TANTALUM 2.2 uf ±10,20V (05397)	1	C105

Reference Designation	Figure & Index Number	Part No.	RCI
A101	1-9		A02019-1
	2-		
A102	1-10		A01321-1
	7-		
A103	1-3		A01627
	13-		
A104	1-5	Used RA6217A	A01323-1
	26-	Used RA6217A-3	
A105	1-13		A03446
	10-		
A106	1-7		A01320
	24-		
A107	1-14		A05030
	29-		
A108	15-2		A01324
	1-12		
	19-		
A109	1-12		A01326-2
	15-1		
	16-		
A110	1-2		A02087-1
	34-		
A111	1-4		A02029-2
	39-		
A112	1-54		D01502
	38-		
A113	1-8		A02088
	32-		
A114	(Not Used)		
A201	5-1		D01366
A202	5-2		D01367
A203	5-1		D01366
A204	5-3		D03041
A205	4-1		D02959
A206	4-2		D02960
A207	4-1		D02959
A208	2-1		A02591-1
	3-		
A401	10-1		A03309
	11-		
A402	10-1		A03309
	11-		
A501	14-1		D02981
A502	14-2		D02975
A503	14-3		D02976
A504	14-4		D02977
A505	14-5		D02830
A506	14-6		D02978
A507	14-7		D02979
A508	14-8		D02980

Reference Designation	Figure & Index Number	Part No.	RCI
A601	17-1		D02064
A701	22-1		D02957
A702	23-1		D03031
A901	27-1		C02274
A1201	43-1		D02042
A1202	43-2		D02043
A1301	33-		A02584-1
A1401	42-1		D02037
A1402	42-2		D02038
A1601	36-1		D02984
A1701	41-1		D02936
A1702	41-2		D02937
A1703	41-3		D02938
A1801	46-1		D03780
A1802	46-2		D03781
A1803	46-3		D03783
A3001	38-1		A02034-1
	40-		
A3002	39-2		D01657
	42-		
A3003	39-3		A01666
	43-		
A3004	39-4		A02031
	44-		
A3005	39-5		A02026
	45-		
A3006	39-6		A03323
	46-		
A3201	34-1		A02054
	35-		
A3202	34-2		A01774
	37-		
AT101	1-74		B03290
AT3001	39-7		B03290
A3203	37-		A01774
C101	1-40		21706
C102	1-40		21706
C103	1-42		
C104	1-42		
C105	49-8		25002
C106	49-7		21706
C107	49-6		25003
C108	49-5		25001
C109	49-7		21706
C110	1-42		
C111	1-41		
C112	1-40		21706
C201	4-3		22318
C202	4-4		22320

Reference Design-ation	Figure & Index Number	Part No.	
			RCI
C203	4-5		22305
C204		Not Used	
C205	4-4		22320
C206	4-3		22318
C207	3-1		28019
C208	3-1		28019
C209	3-1		28019
C210	3-1		28019
C211	3-2		B02023
C212	3-3		28021
C213	5-4		21706
C214	5-4		21706
C215	5-4		21706
C216	5-4		21706
C217	5-4		21706
C218	5-4		21706
C219	5-4		21706
C220	5-4		21706
C221	5-4		21706
C222	5-5		25003
C223	5-4		21706
C224	5-4		21706
C225	5-4		21706
C226	5-4		21706
C227	2-2		21706
C228	3-2	p/o C211	
C229	3-4		26803
C230	3-4		26803
C301	7-1		21706
C302	7-1		21706
C303	8-1		21730
C304	8-2		21706
C305	8-2		21706
C306	8-2		21706
C307	8-2		21706
C308	7-2		21703
C309	8-3		26808
C310	8-3		26808
C311	9-1		26809
C312	9-1		26809
C313	9-1		26809
C314	9-1		26809
C315	9-1		26809
C316	9-1		26809
C317	9-3		26810
C318	9-2		26817

Reference Design-ation	Figure & Index Number	Part No.	
			RCI
C401	10-2		C02409
C402	12-1		21321
C403	12-2		29500
C404	12-3		21719
C405	12-4		22328
C406	12-3		21719
C407	10-3		26401
C408	12-5		
C1,A401	11-1		22314
C2,A401	11-2		21719
C3,A401	11-3		22338
C4,A401	11-4		21723
C5,A401	11-2		21719
C6,A401	11-4		21723
C7,A401	11-5		21321
C8,A401	11-6		21718
C9,A401	11-6		21718
C501	14-9		21703
C502	14-10		21706
C503	14-10		21706
C504			
C505	14-10		21706
C506	14-10		21706
C507	14-32		22301
C508		Not Used	
C509	14-9		21703
C510	14-10		21706
C511	13-1		21706
C512	13-1		21706
C513			
C514	14-11		22359
C515		Not Used	
C516	14-12		22356
C517	14-13		22358
C518	14-14		22355
C519	14-15		22357
C520	14-9		21703
C521	14-16		22360
C522	14-11		22359
C523		Not Used	
C524		Not Used	
C601	17-2		21703
C602	17-3		21706
C603	17-20		21706
C604	17-2		21703
C605	17-2		21703
C606	17-2		21703

Reference Design-ation	Figure & Index Number	Part No.		Reference Design-ation	Figure & Index Number	Part No.	
			RCI				RCI
C607	17-2		21703	C726	23-2		21706
C608	17-3		21706	C727	23-3		21719
C609	17-4		21718	C728	20-2		28020
C610	17-19		21723	C729	20-3		22029
C611		Not Used		C730	23-2		21706
C612	17-3		21706	C731	23-2		21706
C613	18-1		21706	C732	23-4		22318
C614	18-1		21706	C733	23-5		21702
C615		Not Used		C734	23-4		22318
C616	18-2		22330				
C617	18-3		22338	C801	25-1		26810
C618	18-4		21718	C802	25-1		26810
C619		Not Used		C803	25-1		26810
C620	18-5		28021	C804	25-1		26810
C621	18-6		22306	C805	25-1		26810
C622	18-7		25007	C806	25-1		26810
C623	18-1		21706	C807	25-1		26810
C624	18-8		21702	C808	25-2		26822
C625	18-1		21706				
C626		Not Used		C901	27-2		21706
C627		Not Used		C902	27-3		21723
C628	18-1		21706	C903	27-2		21706
C629	16-1		21706	C904	27-3		21723
C630	16-2		25002	C905	27-4		22326
				C906	27-5		22328
C701	19-1		21706	C907	27-6		22312
C702	19-1		21706	C908	27-31		21720
C703	20-1		21706	C909	27-5		22328
C704	20-1		21706	C910	27-7		22318
C705	20-1		21706	C911	27-4		22326
C706		Not Used		C912	27-2		21706
C707	21-1		22306	C913	27-2		21706
C708	21-2		28020	C914	27-3		21723
C709	21-3		22308	C915	27-3		21723
C710	21-4		28021	C916	27-8		22344
C711	21-3		22308	C917	27-8		22344
C712		Not Used		C918	26-1		21706
C713	21-2		28020	C919	26-2		24005
C714	21-3		22308	C920	28-1	RA6217A3	21706
C715	21-4		28021	C921	28-1	RA6217A3	21706
C716	21-5		22304	C922	28-2	RA6217A3	22324
C717	22-2		21706	C923	28-3	RA6217A3	22340
C718	22-2		21706	C924	28-1	RA6217A3	21706
C719	22-3		21723	C925	28-1	RA6217A3	21706
C720	22-3		21723	C926	28-4	RA6217A3	21723
C721	22-3		21723	C927	28-4	RA6217A3	21723
C722	22-3		21723	C928	28-5	RA6217A3	22336
C723		Not Used		C929	28-4	RA6217A3	21723
C724		Not Used		C930	28-4	RA6217A3	21723
C725	23-2		21706	C932	26-1		21706

Reference Design-ation	Figure & Index Number	Part No.		Reference Design-ation	Figure & Index Number	Part No.	
			RCI				RCI
C1001	30-1			C1234	43-17		22003
C1002	30-1			C1235	43-3		21706
C1003	29-1		C02838	C1236	43-5		21704
C1004	29-2		29500	A1C1301	33a-1		24011
C1005	30-2		21003	C1301	33-1		21717
C1006	30-3		21337	C1302	33-1		21717
C1007	30-4		21719	C1303	32-1		24014
C1008	31-1		25010	A1C1302	33a-2		21732
C1009	31-1		25010	A1C1304	33-4a		24015
C1010	31-2		21731	C1304	32-1		24014
C1011	31-2		21731	C1305	33-20		21712
C1012	31-2		21731	C1306	33-2		21706
C1013	31-2		21731	C1307	33-3		25015
C1014	31-2		21713	C1305-8	32a-4		21702
C1015	31-2		21731	C1401	42-3		25007
C1016	31-2		21713	C1402	42-4		22029
C1017	31-2		21713	C1403	42-5		22073
C1018	29-3		21706	C1404	42-6		22053
				C1405	42-7		21706
C1201	43-3		21706	C1406	42-8		22036
C1202	43-4		21712	C1407	42-7		21706
C1203	43-3		21706	C1408	42-7		21706
C1204	43-5		21704	C1409		Not Used	
C1205	43-6		25006	C1410	42-7		21706
C1206	43-7		22023	C1411	42-7		21706
C1207		Not Used		C1412	42-9		25005
C1208	43-5		21704	C1413	42-10		25004
C1209	43-3		21706				
C1210	43-8		21711	C1500	38-1		24007
C1211	43-9		21703	C1501	38-2		21706
C1212	43-3		21706	C1502	38-3		24008
C1213	43-10		25015	C1503	38-1		24007
C1214	43-5		21704	C1504	38-4		25002
C1215	43-11		22026	C1505	38-1		24007
C1216	43-12		24011	C1506	38-1		24007
C1217	43-5		21704	C1507	38-1		24007
C1218	43-5		21704	C1508	38-1		24007
C1219	43-13		28022	C1509	38-5		21703
C1220	43-14		21323	C1510	38-6		24006
C1221	43-11		22026	C1511	38-8		24005
C1222	43-15		22010				
C1223	43-16		29002	C1601	36-2		21706
C1224	43-3		21706	C1602	36-2		21706
C1225	43-5		21704	C1603	36-2		21706
C1226	43-3		21706	C1604		Not Used	
C1227	43-17		22003	C1605	36-2		21706
C1228	43-13		28022				
C1229	43-18		22031	C1701	41-4		21706
C1230		Not Used		C1702	41-4		21706
C1231	43-4		21712	C1703	41-5		21731
C1232	43-18		22031	C1704	41-6		24019
C1233	43-13		28022	C1705	41-4		21706

Reference Designation	Figure & Index Number	Part No.	RCI
C1706	41-5		21731
C1707	41-4		21706
C1708	41-4		21706
C1709	41-4		21706
C1710	41-5		21731
C1711	41-4		21706
C1712	41-7		24005
C1713	41-5		21731
C1714	41-5		21731
C1801	46-4		25008
C1802	46-5		21706
C1803	46-6		22303
C1804	46-7		26828
C1805	46-8		21702
C1806	46-9		28021
C1807		Not Used	
C1808	46-10		21716
C1809	46-5		21706
C1810	46-5		21706
C1811	46-5		21706
C1812	46-5		21706
C1813	46-4		25008
C1814		Not Used	
C1815	46-11		22023
C1816		Not Used	
C1817	46-12		25002
C1818	46-13		21704
C1901	37-1		21706
C1902	37-2		24019
C1903	37-3		24005
C2901	45-1		28021
C2902	45-2		21712
C2903	45-2		21712
C2904	45-3		21713
C2905	45-4		25007
C2906	45-2		21712
C2907	45-5		21706
C2908	45-4		25007
C2909	45-5		21706
C2910	45-6		22036
C2911	45-7		22025
C2912	45-8		21731
C2913	45-9		22057
C2914	45-10		21714
C2915	45-10		21714
C2916	45-11		21715
C2917	45-12		22008
C2918		Not Used	

Reference Designation	Figure & Index Number	Part No.	RCI
C3101	44-1		22031
C3102	44-2		26826
C3103	44-3		21706
C3104	44-4		25002
C3201	34-3		21712
CR101	1-53		35526
CR201	5-6		35508
CR202	5-6		35508
CR203	5-6		35508
CR601	18-9		35512
CR701	20-4		35508
CR901	27-9		35512
A1CR1001	30-18		29009
A1CR1002	30-18		29009
A2CR1001	31-3		35514
A2CR1002	31-3		35514
CR1201	43-19		35508
A1CR1301	33a-5		35513
A1CR1302	33a-5		35513
CR1301	33-4		35513
CR1302	33-6		35514
CR1303	33-6		35514
CR1304	33-7		35507
CR1305	33-4		35513
CR1401	42-11		35509
CR1402	42-12		35512
CR1403	42-12		35512
CR1601	36-3		35508
CR1701	41-8		35507
CR2901	45-13		35510
CR2902	45-13		35510
CR3101	44-5		35508
DS101	1-59		
DS102	1-59		
E201	2-3		64001
E6,401	11-9		99971
F201	4-6		40006
F201	4-6		40006
F13C1	32-2,32a-5		40011
F1302	32-3		40012
F1302	32a-6		40015

Reference Designation	Figure & Index Number	Part No.	RCI
FL3201	34-4		C01533
FL3202	34-5		C01512
FL3203	34-6		C01513
FL3204	34-7		C01514
FL3205	34-8		C01515
J101	1-23		60033
J101-A1	p/o J101		60014
J101-A2	p/o J101		60014
J101-A3	p/o J101		60014
J101-A4	p/o J101		60014
J102	1-75		60002
J103	1-75		60002
J104	1-75		60002
J105	1-75		60002
J106	1-75		60002
J107	1-75		60002
J108	1-71		61502
J109	1-29		61021
J110	1-23		60033
J110-A1	p/o J110		60025
J110-A2	p/o J110		60025
J110-A3	p/o J110		60025
J110-A4	p/o J110		60025
J111			
J112			
J113	1-75		60002
J201	2-4		60002
J601	16-3		60033
J601-A1	16-4		60025
J601-A2	16-4		60025
J601-A3	16-4		60025
J601-A4	16-4		60025
J1001	29-5		60034
J1001A1	thru		
J1001A3	p/o J1001		60020
J1601		p/o W1601	
J3001		Not Used	
J3002	39-8		60002
J3003	39-8		60002
J3004	39-8		60002
J3005		p/o W3001	
J3201	34-9		61019
J3401	47-2		A02900-1
L201	3-5		43016
L301	9-4		D02974
L302 to L308	9-5		D02973
L401	12-6		D02968
L701	21-6		D02956
L702	21-7		D02955
L703	21-6		D02956
L704	21-7		D02955
L801	25-3		D02972
L802	25-4		D02971
L803	25-4		D02971
L804	25-4		D02971
L805	25-4		D02971
L806	25-4		D02971
L807	25-4		D02971
L901	27-10		D02965
L902	27-11		D02967
L903	27-12		D02966
L904	27-13		D02969
L905	27-14		D02136
L906	27-14		D02136
L907		Not Used	
L908	27-15		D02970
L909	28-6	RA6217A3	47031
L910	28-7		47030
L1001	29-7		D05027
L1201	43-20		D02573
L1202	43-21		D02944
L2901	45-14		A04624
L3401 thru L3414	47-3		
M101	1-69		
ML601	18-10		36509
P401	10-5	p/o W401	
P402	10-6	p/o W402	

Reference Designation	Figure & Index Number	Part No.	RCI
P501	13-2		60018
P901	26-3		60018
P901A1 thru P901A4	26-4		60025
P1301	32-4		61020
P1301	32a-7		61020
P1302	(32-11)	p/o W1301	
P1302	(32a-14)	p/o W1301	
P3001	39-9		61015
P3201	34-10		60032
P3202	34-11		60024
Q201	5-7		30252
Q202	5-8		30253
Q203	5-7		30252
Q204	5-8		30253
Q301	8-5		30252
Q302	8-5		30252
Q401	12-7		30252
Q1,A401	11-7		30500
Q2,A402	11-8		30252
Q501	14-17		30500
Q502	14-18		30251
Q503	14-19		30252
Q601	17-5		30251
Q602	17-5		30251
Q603	17-6		30754
Q604	18-11		30251
Q701	20-5		30252
Q702	22-4		30252
Q703	23-15		30500
Q704	23-6		30251
Q705	22-4		30252
Q901	27-16		30252
Q902	27-17		31254
Q903	27-17		31254
Q1001	30-6		31500
Q1002	31-4		31500
Q1003	31-4		31500
Q1004	31-4		31500

Reference Designation	Figure & Index Number	Part No.	RCI
Q1201	43-22		30251
Q1202	43-23		30252
Q1203	43-22		30251
Q1204	43-22		30251
Q1205	43-22		30251
Q1206	43-22		30251
Q1207	43-22		30251
Q1301	32a-8		32002
Q1301	33-8		31251
A1Q1301	33a-8		31507
A1Q1302	33a-8		31507
Q1302	33-9		30750
Q1303	33-10		31507
Q1304	32-5		30751
Q1401	42-13		30252
Q1402	42-14		32000
Q1403	42-15		31251
Q1404	42-15		31251
Q1405	42-16		30003
Q1406	42-17		30753
Q1500	38-9		30001
Q1501	38-10		31250
Q1502	38-10		31250
Q1503	38-10		31250
Q1601	36-4		30252
Q1701	41-9		30251
Q1702	41-10		31507
Q1703	41-9		30251
Q1704	41-9		30251
Q1801	46-14		30251
Q1802	46-15		31251
Q1803	46-16		31251
Q1804	46-16		31251
Q1805	46-16		31251
Q1901	37-4		31251
Q2901	45-15		30251
Q2902	45-16		31000
Q2903	45-17		32250
Q2904	45-18		32251
Q3101	44-6		30251
R101	1-43		10635
R102	1-43		10635

Reference Design-ation	Figure & Index Number	Part No.		Reference Design-ation	Figure & Index Number	Part No.	
			RCI				RCI
R103	1-31		16027	R312	9-6		10663
R104	1-29		16059				
R105	1-48			R401	12-8		10639
R106	1-35		A03885	R402	12-9		10615
R107	49-4		10707	R403	12-10		10679
R108	49-3		10713	R404	12-11		10683
R108		Not Used		R405	12-12		10635
R110	49-2		10739	R406	12-13		10687
R111	1-81		10673	R1,A401	11-10		10651
R201	6-2		10619	R2,A401	11-11		10667
R202	6-3		10633	R3,A401	11-12		10685
R203	6-3		10633	R4,A401	11-13		10681
R204	6-4		10631	R5,A401	11-14		10659
R205	6-5		10627	R6,A401	11-15		10635
R206	6-5		10627	R7,A401	11-16		10679
R207	6-3		10633	R8,A401	11-17		10687
R208	6-3		10633	R9,A401	11-18		10631
R209	6-2		10619	R10,A401	11-19		10647
R210	3-6		10655				
R211	5-9		10673	R501	14-20		10697
R212	5-10		10647	R502	14-21		10679
R213	5-11		10679	R503	14-22		10659
R214	5-12		10661	R504	14-23		10689
R215	5-13		16025	R505	14-24		10671
R216	5-14		10639	R506	14-25		10685
R217	5-15		10669	R507	14-21		10679
R218	5-16		10671	R508	14-26		10677
R219	5-17		10625	R509	14-27		10687
R220	5-18		10643	R510	14-28		10655
R221	5-19		10659	R511	14-29		10649
R222	5-14		10639	R512	13-4		10633
R223	5-10		10647	R513	14-30		10639
R224	5-20		10667				
R225	5-18		10643	R601	17-7		10695
R226	5-21		10665	R602	17-8		10683
R227	5-17		10625	R603	17-9		10663
R228	5-19		10659	R604	17-10		10661
R229	5-18		10643	R605	17-11		10639
				R606	17-9		10663
R301	7-3		10633	R607	17-7		10695
R302		Not Used		R608	17-8		10683
R303	8-5		10691	R609	17-11		10639
R304	8-6		10637	R610	17-12		10657
R305	8-6		10637	R611	17-13		10627
R306	8-7		10675	R612	17-9		10663
R307	8-8		10633	R613	17-14		10693
R308	8-8		10633	R614	17-15		10681
R309	8-7		10675	R615	17-16		10669
R310	8-9		10671	R616		Not Used	
R311	8-10		16019	R617	17-17		10662

Reference Designation	Figure & Index Number	Part No.	RCI
R618	18-12		10701
R619	18-13		10687
R620	18-13		10687
R621	18-14		10639
R622	18-15		10683
R623	18-16		10671
R624	18-17		10665
R625	18-18		10697
R626	18-19		10679
R627	18-20		10645
R628	18-21		10643
R629	18-16		10671
R630	18-22		10715
R631	18-12		10701
R632		Not Used	
R633	17-18		10701
R634	16-5		10629
R701	19-2		10633
R702	20-6		10669
R703	20-7		10661
R704	20-8		10653
R705	22-5		10649
R706	22-6		10632
R707	22-7		10691
R708	22-8		10679
R709	22-9		16016
R710	22-10		10641
R711	22-11		10669
R712	22-8		10679
R713	22-7		10691
R714	22-10		10641
R715	22-7		10661
R716	23-7		10697
R717	23-8		10679
R718		Not Used	
R719	23-9		10659
R720	23-10		10689
R721	23-11		10685
R722	20-9		10665
R733	20-8		10653
R724	23-12		10669
R725	23-13		10643
R901	27-18		10651
R902	27-19		10663
R903	27-20		10693
R904	27-21		10615
R905	27-19		10663
R906	27-22		10677
R907	27-23		10637
R908		Not Used	
R909	27-24		10659
R910	27-25		10667
R911		Not Used	
R912	27-22		10677
R913	27-26		10671
R914		Not Used	
R915	27-27		10709
R916	27-20		10693
R917	27-28		10629
R918	26-5		10635
R919	28-9		10679
R920	28-10		10671
R921	28-11		10699
R922	28-12		10629
R923	28-13		10659
R924	28-14		10685
R925	28-15		10691
R926	28-9		10679
R927	28-16		10632
R928	28-17		10663
R929		Not Used	
R930	28-18		10703
R931	28-19		10689
R1001	30-7		10639
R1002	30-8		10651
R1003	30-9		10665
R1004	30-10		10689
R1005	30-11		10659
R1006	30-12		10615
R1007	30-13		10651
R1008	30-14		10703
R1009	13-5		10715
R1010	31-6		10669
R1011	31-7		10653
R1012	31-6		10669
R1013	31-5		10715
R1014	31-8		10636
R1015	31-9		10683
R1016	31-10		10635
R1017	31-11		10663
R1018	31-12		10667
R1019		Not Used	
R1020	31-13		10637
R1021	31-14		10633
R1022	31-15		10687
R1023	31-16		10697
R1024	31-17		10659

Reference Designation	Figure & Index Number	Part No.	
			RCI
R1025	31-18		10623
R1026	31-11		10663
R1027	31-19		10679
R1028	31-16		10697
R1029	31-8		10636
R1201	43-24		10651
R1202	43-25		10663
R1203	43-26		10677
R1204	43-27		10693
R1205	43-28		10633
R1206	43-29		10661
R1207	43-30		10687
R1208	43-30		10687
R1209	43-31		10627
R1210	43-25		10663
R1211	43-25		10663
R1212	43-25		10663
R1213	43-26		10677
R1214	43-27		10693
R1215	43-25		10663
R1216	43-32		10667
R1217	43-33		10689
R1218	43-34		10671
R1219	43-35		10649
R1220		Not Used	
R1221	43-25		10663
R1222	43-25		10663
R1223	43-35		10649
R1224	43-36		10659
R1225	43-37		10675
R1226	43-38		10695
R1227	43-39		10673
R1228	43-40		10679
R1229	43-25		10663
R1230		Not Used	
R1231	43-38		10695
R1232	43-41		10639
R1233	43-42		10653
R1234	43-40		10679
R1235	43-43		10707
R1236	43-33		10689
R1237	43-33		10689
R1238	43-43		10707
R1239	43-42		10653
R1240	43-40		10679
R1241	43-38		10695
R1242	43-25		10663
R1243	43-41		10639
R1301	32a-9		

Reference Designation	Figure & Index Number	Part No.	
			RCI
R1301	33-11		10711
R1302	32-6		14032
R1303	33-12		11293
R1304	33-13		10635
R1305		Not Used	
R1306	33-14		10673
R1307	33-15		16013
R1308	33-16		10671
R1309	33-17		10651
R1310	33-18		10665
AIR1300 series 33a		See page 6-146	
R1401	42-18		10691
R1402	42-19		10677
R1403	42-20		16025
R1404	42-21		10663
R1405	42-22		10651
R1406	42-23		10693
R1407	42-24		10689
R1408	42-21		10663
R1409		Not Used	
R1410	42-25		10717
R1411	42-26		10713
R1412	42-27		10687
R1413	42-27		10687
R1414	42-28		10731
R1415	42-29		16030
R1416	42-30		10683
R1417	42-26		10713
R1418	42-21		10663
R1419	42-31		10671
R1420	42-30		10683
R1421	42-18		10691
R1422	42-32		12001
R1423	42-33		10675
R1500	38-11		10681
R1501	38-12		10671
R1502	38-12		10671
R1503	38-11		10681
R1504	38-13		10651
R1505	38-11		10681
R1506	38-14		10695
R1507	38-15		10691
R1508	38-16		10715
R1509	38-17		10655
R1510	38-17		10655
R1511	38-16		10715
R1512	38-18		10663
R1513	38-16		10715
R1514	38-19		10687
R1515	38-20		10707

Reference Design-ation	Figure & Index Number	Part No.		Reference Design-ation	Figure & Index Number	Part No.	
			RCI				RCI
R1516	38-21		10635	R1822	46-31		10641
R1517	38-12		10671				
R1601	36-5		10639	R1901	37-5		10711
R1602	36-5		10639	R1902	37-6		10687
R1603	36-6		10693	R1903	37-7		10695
R1604	36-7		10679	R1904	37-8		10681
R1605	36-8		10677	R1905	37-9		16014
R1606	36-9		10655	R1906	37-10		10645
R1607	36-10		10643				
R1701	41-11		10643	R2901	45-19		10707
R1702	41-12		10671	R2902	45-20		10687
R1703	41-13		10693	R2903	45-21		10682
R1704	41-14		10677	R2904	45-22		10663
R1705	41-15		10651	R2905	45-23		10697
R1706	41-16		10631	R2906	45-24		10679
R1707	41-17		10663	R2907	45-22		10663
R1708	41-18		10695	R2908	45-25		10646
R1709	41-19		10679	R2909	45-22		10663
R1710	41-19		10679	R2910	45-26		10695
R1711	41-20		10681	R2911	45-22		10663
R1712	41-14		10677	R2912	45-27		10691
R1713	41-21		10687	R2913	45-27		10691
R1714	41-22		10685	R2913	45-28		16023
R1715	41-23		10647	R2914	45-20		10687
R1716	41-14		10677	R2915	45-22		10663
R1717	41-24		10689	R2916	45-29		10656
R1718	41-15		10651	R2917	45-27		10691
R1719	41-25		16019	R2918	45-24		10679
R1720	41-17		10663	R2919	45-24		10679
				R2920	45-24		10679
R1801	46-16		10639				
R1802	46-17		10707	R3101	44-7		10689
R1803	46-18		10653	R3102	44-8		10707
R1804	46-19		10679	R3103	44-9		10653
R1805	46-20		10683	R3104	44-10		10679
R1806	46-21		10695	R3105	44-11		10695
R1807	46-22		10663	R3106	44-12		10663
R1808	46-23		10669	R3201	34-12		10647
R1809	46-16		10639	R3202	34-13		10631
R1810	46-24		10649	R3203	34-14		10639
R1811	46-22		10663	R3204	34-15		10633
R1812	46-16		10639	R3205	34-16		A03882
R1813	46-25		10675	R3206	34-17		10691
R1814	46-26		10693	R3207	34-18		10683
R1815	46-22		10663	R3208	34-18		10683
R1816	46-27		10615	R3209	34-19		10679
R1817		Not Used		R3210	34-19		10679
R1818	46-28		10662	R3211		Not Used	
R1819	46-16		10639	R3212	34-20		10671
R1820	46-29		10665	R3213	34-21		10689
R1821	46-30		10691	R3214	34-22		10695

Reference Designation	Figure & Index Number	Part No.	RCI
R3215	34-23		10701
R3216	34-23		10701
R3217	34-24		10685
R3218	34-25	Determine by Test	
R3219A	34-26		B02161-500
R3219B	34-26		B02161-10K
R3220	34-27		A03881
RT1401	42-34		19300
S101	1-36		51202
S102	1-18		52403
S103	1-18		52403
S104	1-62		
S105		p/o S106	
S106A,B,C	49-1		C01742
S201A,B	6-1		C01273
S202A,B			
C,D	3-7		C01615-1
S1301	32-7		52405
	32a-10		
S3201	34-28		C01744
S3202	34-29		C01611
T201	3-8		D02828
T202	3-9		D02827
T203	3-10		D02826
T204	3-11		D02825
T205	3-12		D02961
T206	3-13		D02824
T301	8-11		D02935
T901	27-29		D02265-2
T1301	32-8		D01650
T1301	32a-11		D01650
T1500	38-22		D02906
T1501	38-23		D02908
T1502	38-24		D02907
TB101	1-77		
TB201	2-5		A02589
TB204	2-6		A02590-1
TB301	7-4		A02555
	8-		
TB302	7-5		A02556
	9-		
TB401	10-4		A02566
	12-		
TB501	13-5		A02562
	14-		
TB601	16-6		A02574
	17-		
TB602	16-7		A03407
	18-		
TB701	19-3		A02569
	20-		
TB702	19-4		A02570
	21-		
TB703	19-5		A02571
	22-		
TB704	19-6		A02572
	23-		
TB801	24-1		A02585-1
	25-		
TB901	26-6		A02576-2
	27-		
TB902	26-7	Used RA6217A-3	A02577
	28-		
TB1001	29-9		A02586
	30-		
TB1002	29-10		A02587
	31-		
TB1301	32-9		A02584-1
	32a-12		
	31-		
	33a		
TB1601	35-1		A02580D1
	36-		
TB1701	40-1		A02837
	41-		
TB3001	39-10		70319
VR201	5-22		35528
VR1001	30-15		33512
VR1002	30-15		33512
VR1003	30-16		33513
VR1004	30-16		33513
VR1005	31-21		33514
VR1301	33-5		33507
VR1301	32a-13		33527
A1VR1301	32a-6		33528
A1VR1302	33a-7		35514
VR1302	32-10		35527
W401	10-5		D01974-5
W402	10-6		D01974-6
W1301	32-11		57001
W1301	32a-14		57001
W1601	35-2		D01974-4
W3001	39-11		D01974-3
W3201	34-34		
XY601	18-24		70850

Reference Design-ation	Figure & Index Number	Part No.		Reference Design-ation	Figure & Index Number	Part No.	
			RCI				RCI
Y601	18-23		B02038				
Y1201	43-44		B02040				
Y1202	43-45		B02041				
Y1801	46-32		37009				
R3101	44-13		B02039				

Appendix B

Federal Supply Code for Manufacturers

B-1. CODE TO NAME

B-2. The following five-digit code numbers are listed in numerical sequence along with the manufacturer's name and address to which the code has been assigned. The Federal Supply Code has been taken from Cataloging Handbook H 4-2, Code to Name.

00141 - PIC Design Corp.
Rockaway, New York

01226 - Vlier Engineering Corp.
Los Angeles, California

01295 - Texas Instruments, Inc.
Semiconductor Components Division
Dallas, Texas

02114 - Ferroxcube Corp.
Saugerties, New York

02681 - Beckman Instruments, Inc.
Electronic Instruments Division
Berkeley Operation
Richmond, California

02735 - RCA Corporation
Solid State Division
Somerville, New Jersey

03508 - General Electric Co.
Semiconductor Products Dept.
Syracuse, New York

03877 - Transitron Electronic Corp.
Wakefield, Massachusetts

04713 - Motorola Semiconductor Products, Inc.
Phoenix, Arizona

05397 - Union Carbide Corp.
Materials Systems Division
Cleveland, Ohio

06281 - Wolfe Vacuum Inc.
Hingham, Massachusetts

06540 - Amatom Electronic Hardware
Division of Mite Corp.
New Rochelle, New York

07263 - Fairchild Semiconductor
A Division of Fairchild Camera
and Instrument Corp.
Mountain View, California

12284 - Cambridge Thermionic of
Canada, Ltd.
Quebec, Canada

12360 - Albany Products Co., Inc.
Norwalk, Connecticut

12881 - Metex Corp.
Edison, New Jersey

13103 - Thermalloy Co.
Dallas, Texas

14655 - Cornelldubilier Electronics
Division
Federal Pacific Electronic Co.
Neward, New Jersey

16733 - Phelps Dodge Communications Co.
A Division of Phelps Dodge
Copper Products Corp.
New Haven, Connecticut

17069 - Circuit Structures Lab
Burbank, California

17117 - Electronic Molding Corp.
Pawtucket, Rhode Island

19373 - Eastron Corp.
Haverhill, Massachusetts

49315 - Puritan Compressed Gas Corp.
Kansas City, Missouri

56289 - Sprague Electric Co.
North Adams, Massachusetts

71468 - ITT Cannon Electric Inc.
Los Angeles, California

71590 - Globeunion Inc.
Centralab Division
Milwaukee, Wisconsin

71729 - Crescent Box Corp.
Philadelphia, Pennsylvania

71785 - Cinch Manufacturing Co.
and Howard B. Jones Division
Chicago, Illinois

72259 - Nytronics, Inc.
Pelham Manor, New York

72982 - Erie Technological Products, Inc.
Erie, Pennsylvania

73734 - Federal Screw Products, Inc.
Chicago, Illinois

73899 - J.F.D. Electronics Corp.
Brooklyn, New York

74868 - Bunkerramo Corp.
The Amphenol RF Division
Danbury, Connecticut

75382 - Kulka Electric Corp.
Mt. Vernon, New York

75915 - Littlefuse Inc.
Des Plaines, Illinois

76055 - Mallory Controls
Division of Mallory P.R. & Co., Inc.
Frankfort, Inidana

76385 - Minor Rubber Co., Inc.
Bloomfield, New Jersey

76854 - Oak Manufacturing Co.
Division of Oak Electro/Netics Corp.
Crystal Lake, Illinois

78553 - Tinnerman Products, Inc.
Cleveland, Ohio

79282 - Western Machinery Corp.
Portland, Oregon

79963 - Zierick Manufacturing Co.
Mt. Kisco, New York

80207 - Unimax Switch
Division of Maxson Electronics Corp.
Wallingford, Connecticut

80294 - Bourns, Inc.
Riverside, California

82389 - Switchcraft, Inc.
Chicago, Illinois

83186 - Victory Engineeri g Corp.
Springfield, New Jersey

83330 - Smith Herman H. Inc.
Brooklyn, New York

83723 - Peck Spring Co.
Plainville, Connecticut

86928 - Seastrom Manufacturing Co., Inc.
Glendale, California

88141 - Conant Laboratories
Lincoln, Nebraska

91506 - Augat, Inc.
Attleboro, Massachusetts

92966 - Hudson Lamp Co.
Kearny, New Jersey

93332 - Sylvania Electric Products, Inc.
Semiconductor Products Division
Woburn, Massachusetts

94144 - Raytheon Company
Components Division
Industrual Components Operation
Quincy, Massachusetts

95263 - Leecraft Manufacturing Co., Inc.
Long Island City, New York

95987 - Weckesser Co., Inc.
Chicago, Illinois

99934 - Renbrandt, Inc.
Boston, Massachusetts

99942 - Globeunion Inc.
Centralab Semiconductor Division
El Monte, California

CHAPTER 7 - CIRCUIT DIAGRAMS

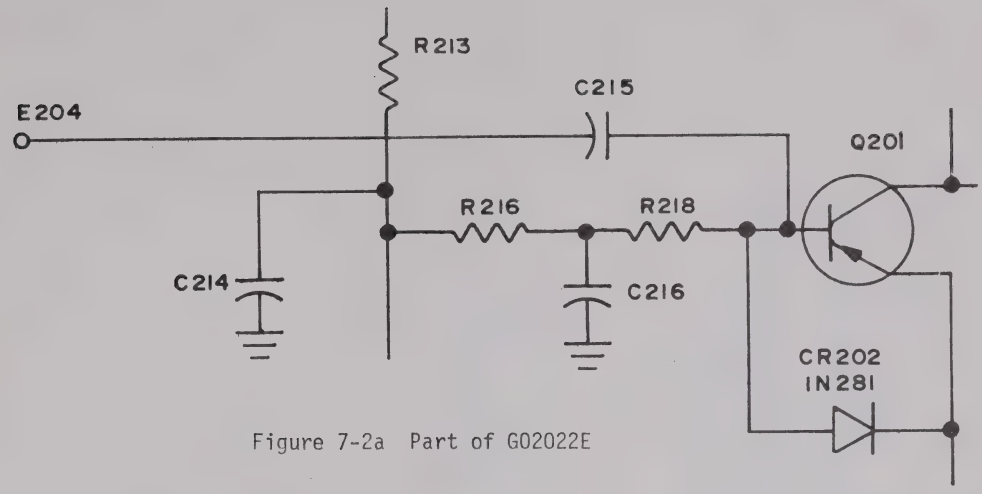


Figure 7-2a Part of G02022E

The design of this circuit (fig. 7-2a) was changed to give better protection from destructive high voltage transients on the antenna. (See fig. 7-2b).

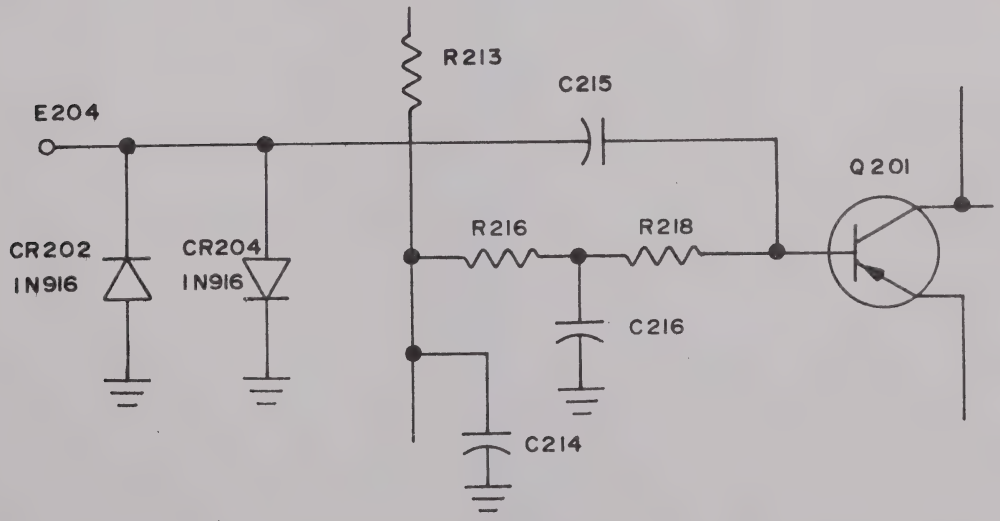
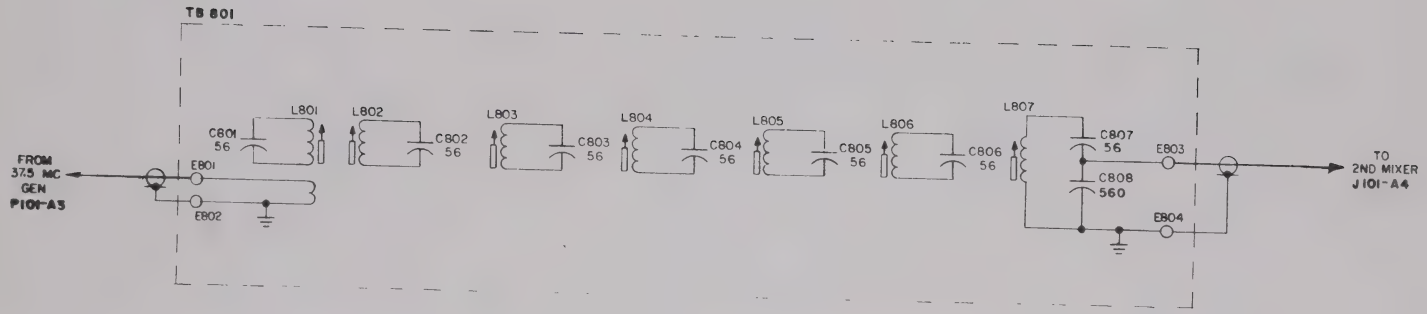


Figure 7-2b Part of G02022F

FIG 7-2a 7-2b

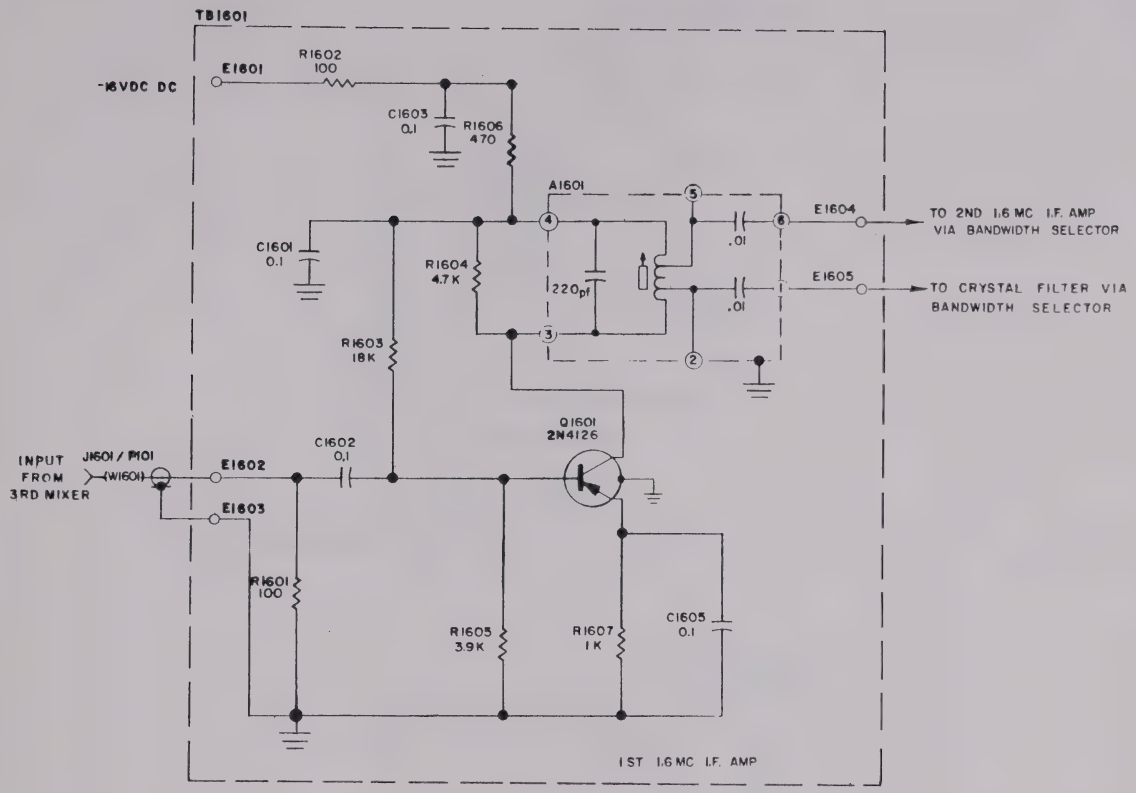


UNLESS OTHERWISE NOTED:

1. RESISTOR VALUES ARE IN OHMS WATT
   K=1,000 M=1,000,000
2. CAPACITOR VALUES GREATER THAN ONE ARE IN PICO FARADS, LESS THAN ONE ARE IN MICROFARAD.
3. INDUCTANCE VALUES GREATER THAN ONE ARE IN MICROHENRIES, LESS THAN ONE ARE IN MILLIHENRIES.
4. PRESENCE OF ARROW INDICATES CLOCKWISE ROTATION
5. INDICATES SCREWDRIVER ADJUSTMENT

37.5 MHz FILTER

FIG 7-7

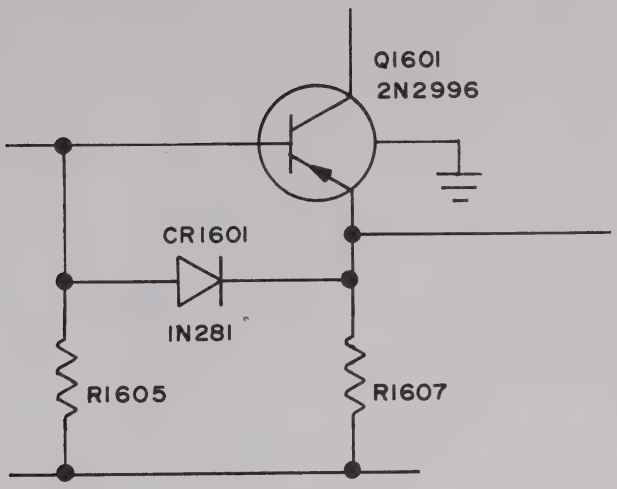


UNLESS OTHERWISE NOTED:

1. RESISTOR VALUES ARE IN OHMS WATT
   K=1,000 M=1,000,000
2. CAPACITOR VALUES GREATER THAN ONE ARE IN PICO FARADS, LESS THAN ONE ARE IN MICROFARAD.
3. INDUCTANCE VALUES GREATER THAN ONE ARE IN MICROHENRIES, LESS THAN ONE ARE IN MILLIHENRIES.
4. PRESENCE OF ARROW INDICATES CLOCKWISE ROTATION
5. INDICATES SCREWDRIVER ADJUSTMENT

1st IF

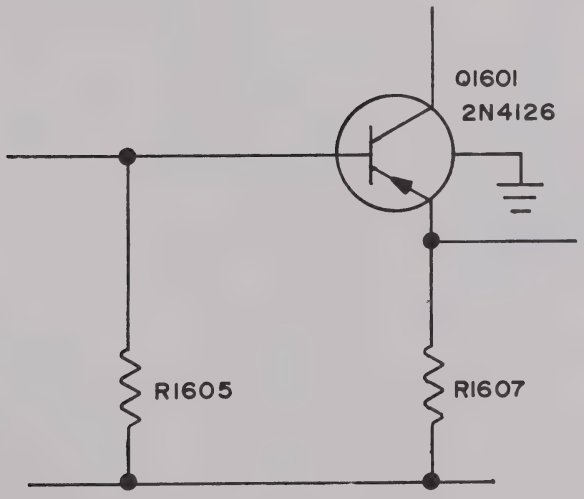
FIG 7-11



Part of G01505B

Figure 7-11a

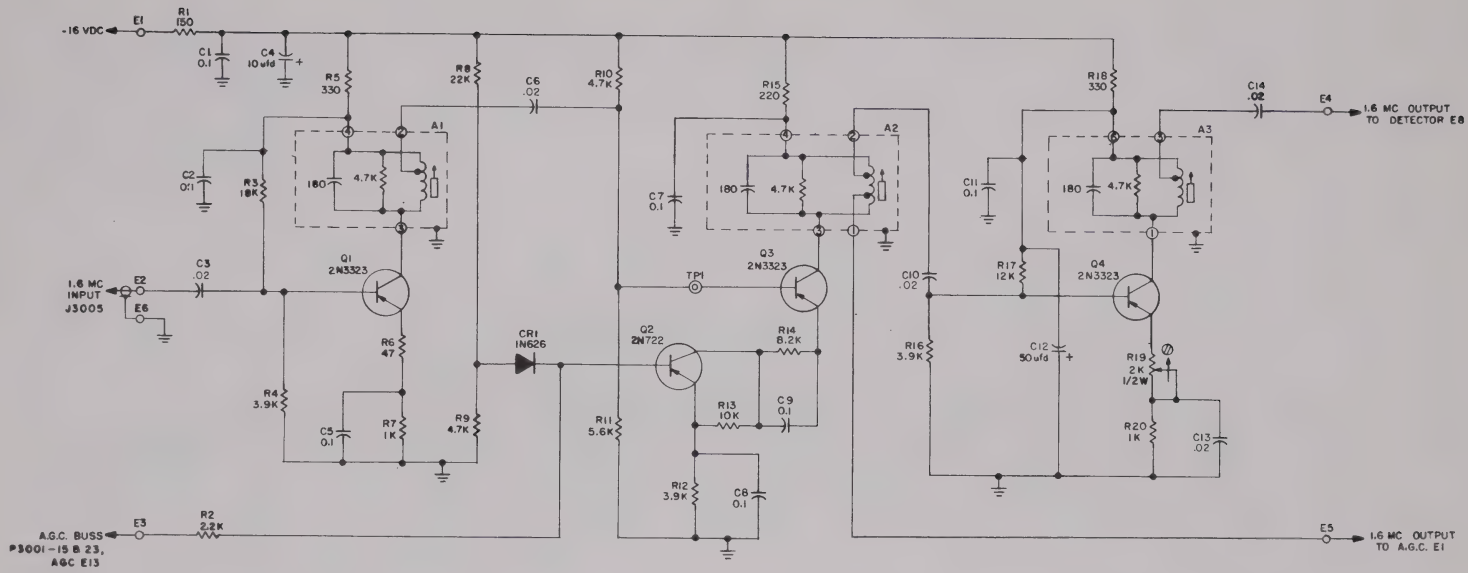
CR1601 was deleted from the 1st IF becasue it was superfluous.



Part of G01505C

Figure 7-11b

FIG 7-11a
7-11b

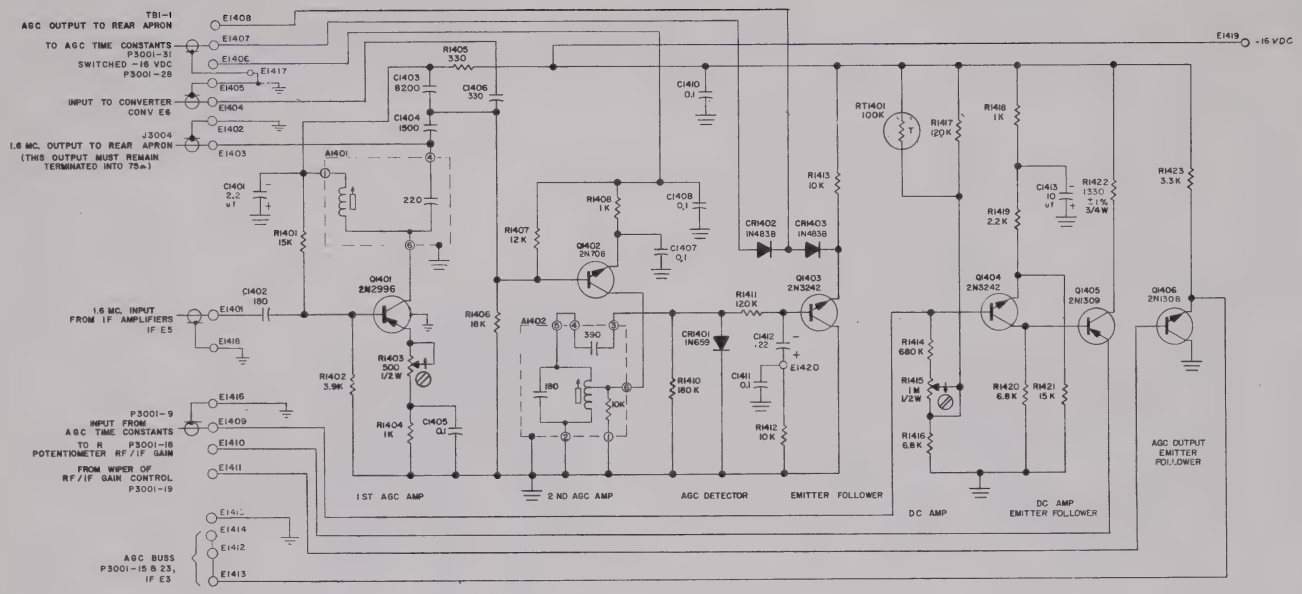


UNLESS OTHERWISE NOTED:

1. RESISTOR VALUES ARE IN OHMS ¼ WATT
   K=1,000 M=1,000,000
2. CAPACITOR VALUES GREATER THAN ONE ARE IN PICO FARADS, LESS THAN ONE ARE IN MICROFARAD.
3. INDUCTANCE VALUES GREATER THAN ONE ARE IN MICROHENRIES, LESS THAN ONE ARE IN MILLIHENRIES.
4. PRESENCE OF ARROW INDICATES CLOCKWISE ROTATION
5. INDICATES SCREWDRIVER ADJUSTMENT

2nd, 3rd, 4th IF

FIG 7-13

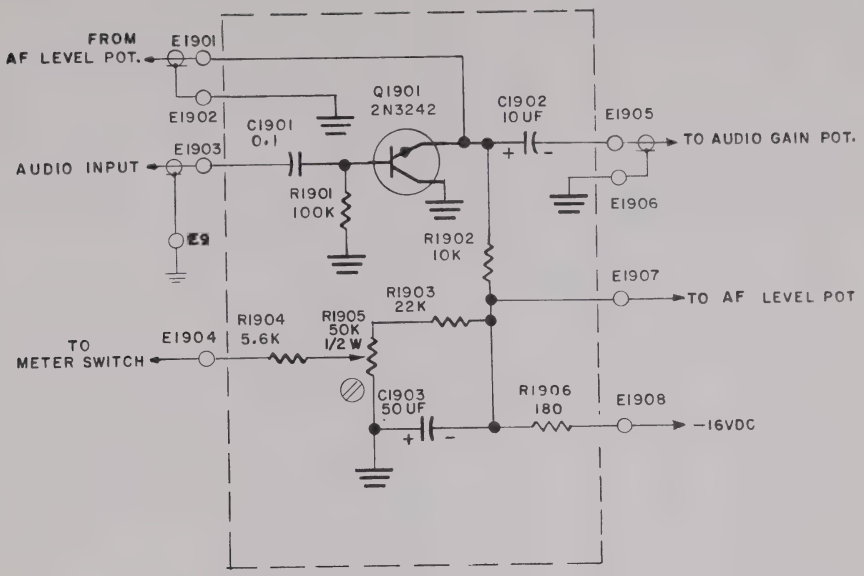


UNLESS OTHERWISE NOTED:

1. RESISTOR VALUES ARE IN OHMS 1/4 WATT
   K=1,000 M=1,000,000
2. CAPACITOR VALUES GREATER THAN ONE ARE IN PICO FARADS, LESS THAN ONE ARE IN MICROFARAD.
3. INDUCTANCE VALUES GREATER THAN ONE ARE IN MICROHENRIES, LESS THAN ONE ARE IN MILLIHENRIES.
4. PRESENCE OF ARROW INDICATES CLOCKWISE ROTATION
5. INDICATES SCREWDRIVER ADJUSTMENT

AGC

FIG 7-14

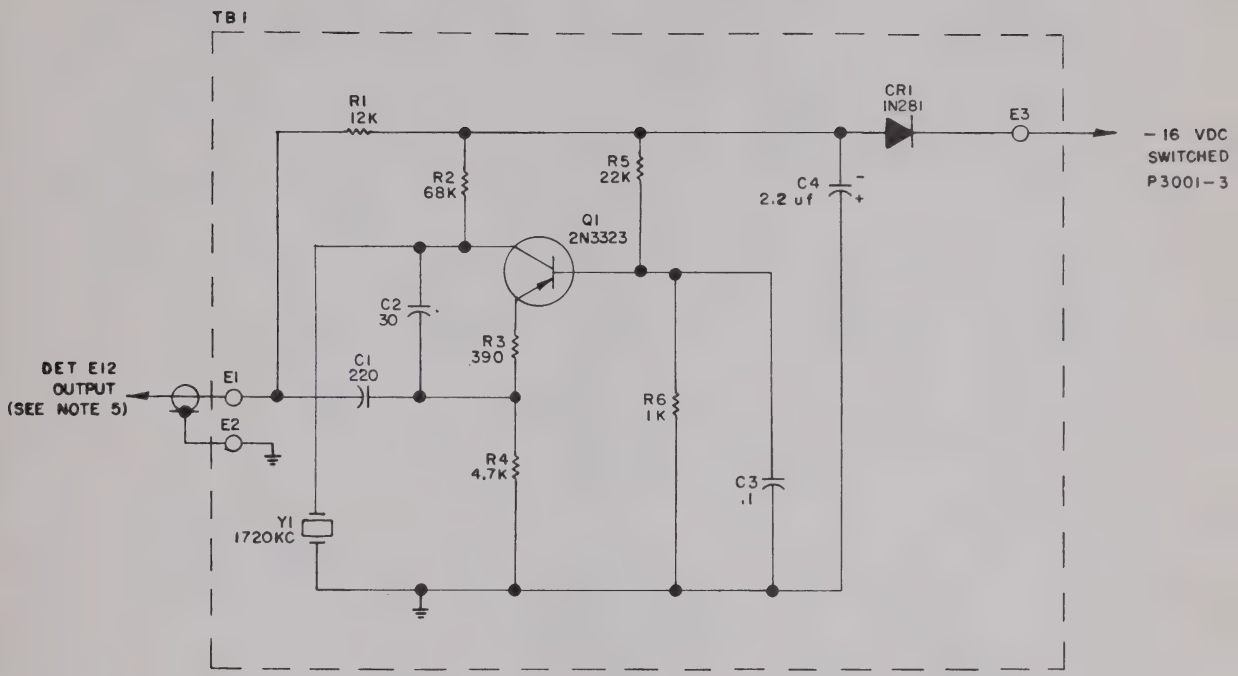


UNLESS OTHERWISE NOTED:

1. RESISTOR VALUES ARE IN OHMS ¼ WATT
   K=1,000 M=1,000,000
2. CAPACITOR VALUES GREATER THAN ONE ARE IN PICO FARADS, LESS THAN ONE ARE IN MICROFARAD.
3. INDUCTANCE VALUES GREATER THAN ONE ARE IN MICROHENRIES, LESS THAN ONE ARE IN MILLIHENRIES.
4. PRESENCE OF ARROW INDICATES CLOCKWISE ROTATION
5. INDICATES SCREWDRIVER ADJUSTMENT

EMITTER FOLLOWER
METER ZERO

FIG 7-16

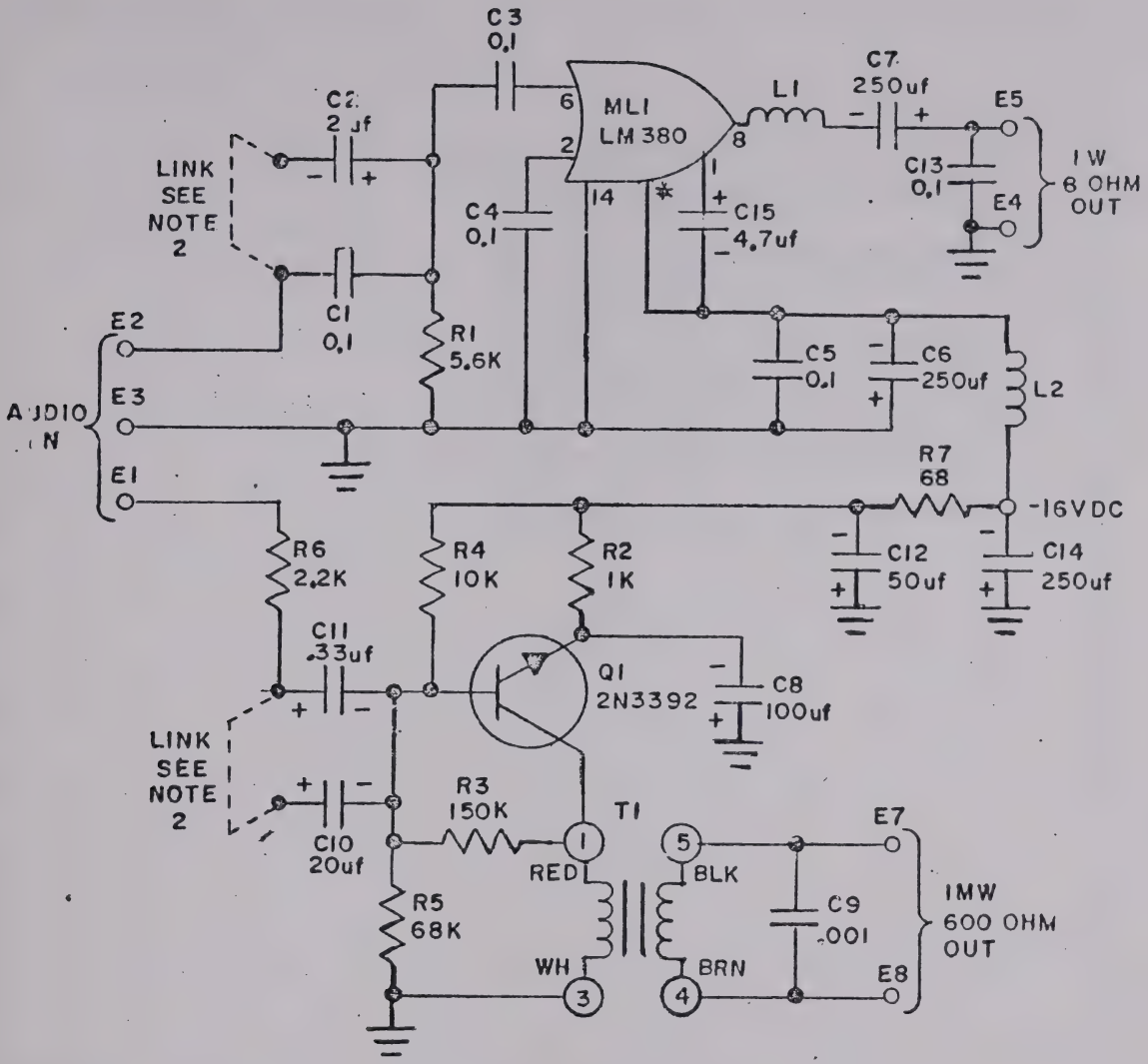


UNLESS OTHERWISE NOTED:

1. RESISTOR VALUES ARE IN OHMS WATT
   K=1,000 M=1,000,000
2. CAPACITOR VALUES GREATER THAN ONE ARE IN PICO FARADS, LESS THAN ONE ARE IN MICROFARAD.
3. INDUCTANCE VALUES GREATER THAN ONE ARE IN MICROHENRIES, LESS THAN ONE ARE IN MILLIHENRIES.
4. PRESENCE OF ARROW INDICATES CLOCKWISE ROTATION
5. INDICATES SCREWDRIVER ADJUSTMENT

FM INSERTION OSC.

FIG 7-18



NOTES:

1. * PINS 3,4,5,7,10,11, 12 CONNECTED TO COPPER AREA FOR HEAT SINK.
2. LINK CONNECTED GIVES AUDIO RESPONSE DOWN TO 50 Hz.

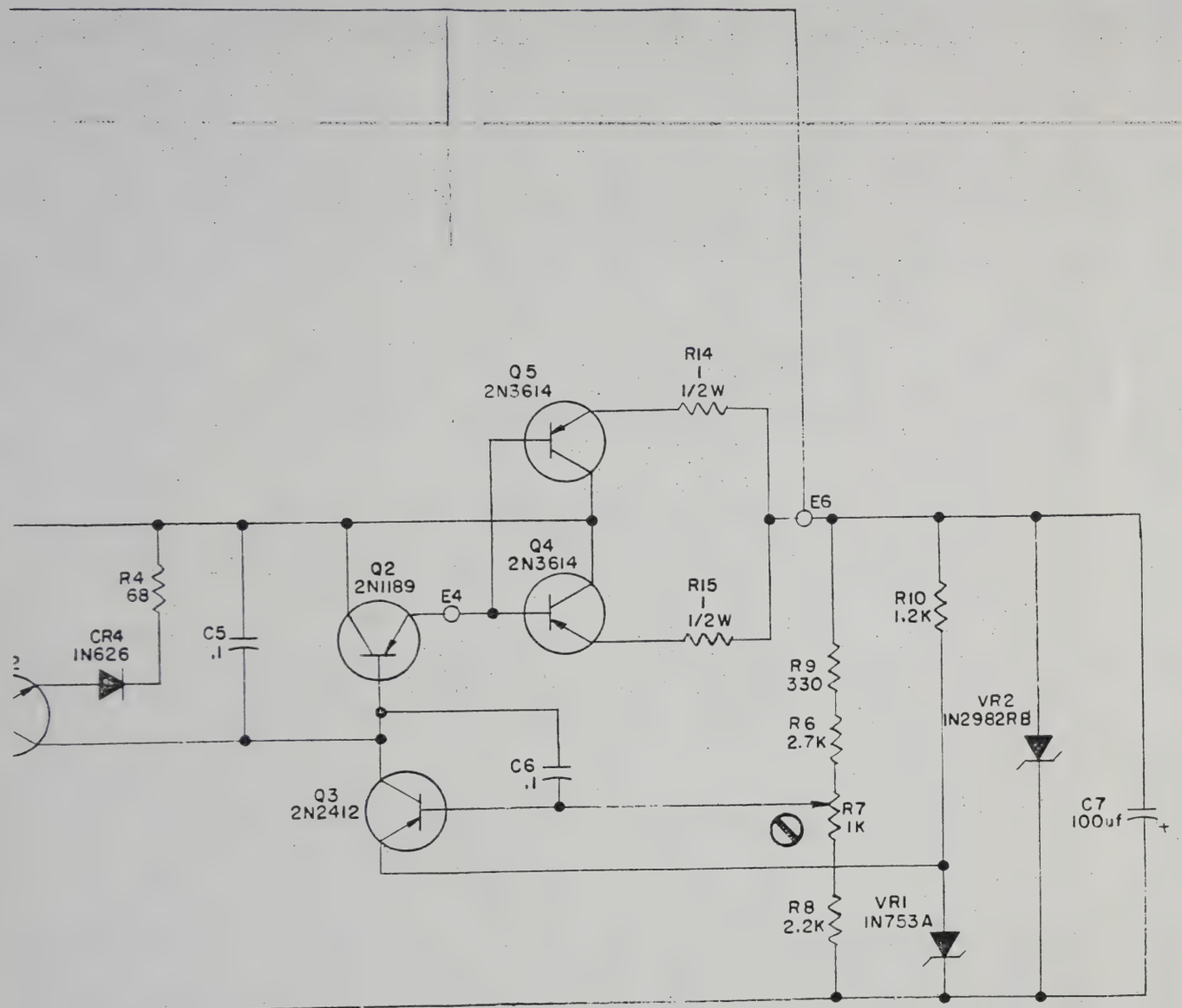
1 WATT
AUDIO AMPL. BD.
C05591C

UNLESS OTHERWISE NOTED:

1. RESISTOR VALUES ARE IN OHMS 1/4 WATT
   K = 1,000 M = 1,000,000
2. CAPACITOR VALUES GREATER THAN ONE ARE IN PICO FARADS, LESS THAN ONE ARE IN MICROFARADS.
3. INDUCTANCE VALUES GREATER THAN ONE ARE IN MICROHENRIES, LESS THAN ONE ARE IN MILLIHENRIES.
4. PRESENCE OF ARROW INDICATES CLOCKWISE ROTATION

   INDICATES SCREWDRIVER ADJUSTMENT

RACAL
DC TO DC CONVERTER
DWG G-02449 C
SERIES 100

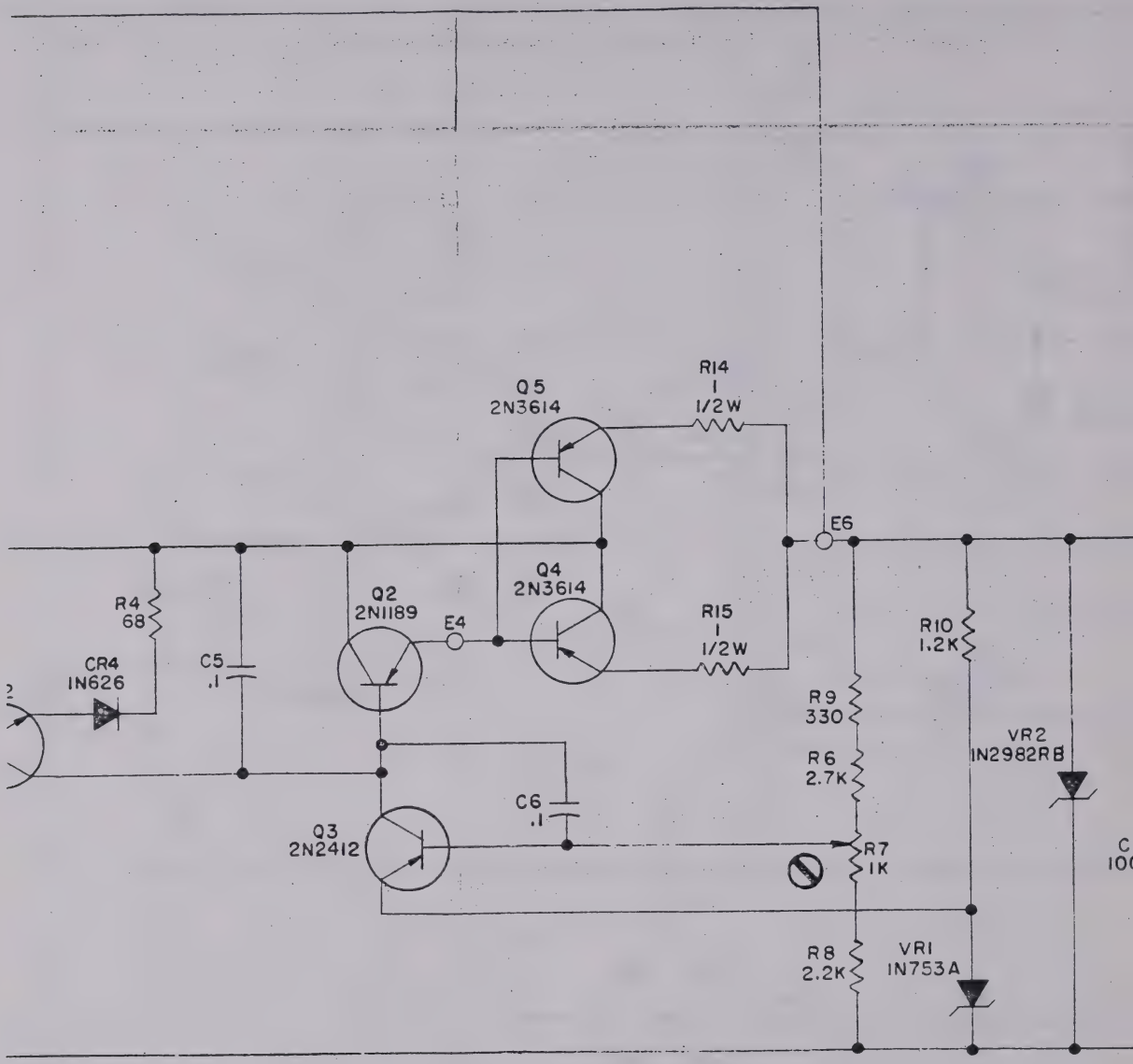


UNLESS OTHERWISE NOTED:

1. RESISTOR VALUES ARE IN OHMS 1/4 WATT
   K = 1,000 M = 1,000,000
2. CAPACITOR VALUES GREATER THAN ONE ARE IN PICO FARADS, LESS THAN ONE ARE IN MICROFARADS.
3. INDUCTANCE VALUES GREATER THAN ONE ARE IN MICROHENRIES, LESS THAN ONE ARE IN MILLIHENRIES.
4. PRESENCE OF ARROW INDICATES CLOCKWISE ROTATION

   ⊘ INDICATES SCREWDRIVER ADJUSTMENT

RACAL
DC TO DC CONVERTER
DWG G-02449 C
SERIES 100

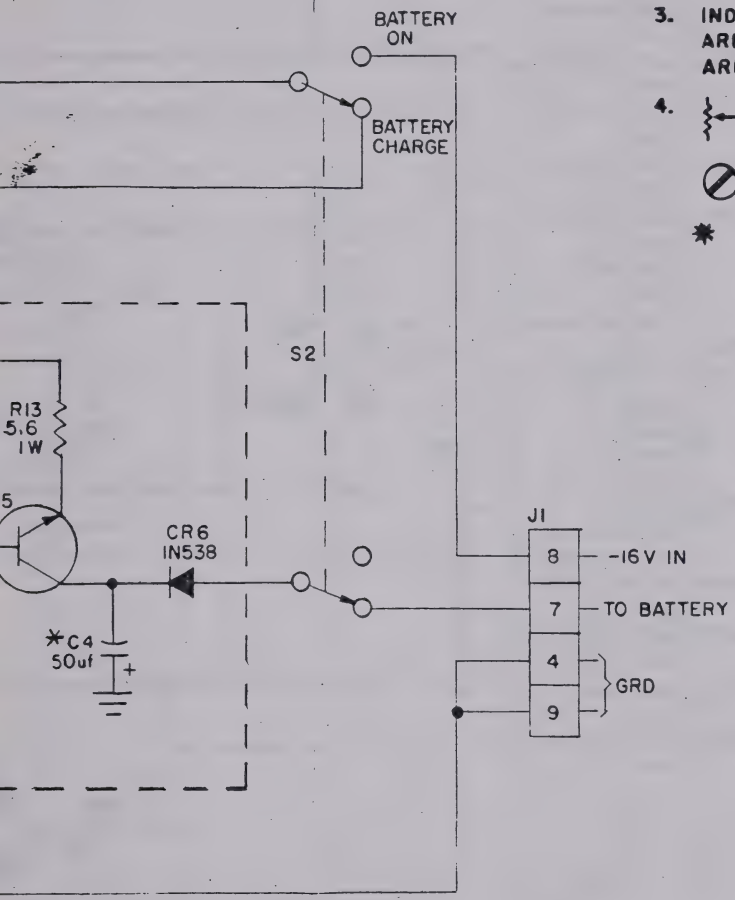

Q5
2N3614
R14
1
1/2W
E6
Q4
2N3614
Q2
2N1189
E4
R15
1
1/2W
R4
68
CR4
IN626
C5
.1
R10
1.2K
R9
330
R6
2.7K
VR2
IN2982RB
C6
.1
Q3
2N2412
R7
1K
R8
2.2K
VR1
IN753A

UNLESS OTHERWISE NOTED:

1. RESISTOR VALUES ARE IN OHMS 1/4 WATT
   K = 1,000 M = 1,000,000
2. CAPACITOR VALUES GREATER THAN ONE ARE IN PICO FARADS, LESS THAN ONE ARE IN MICROFARADS.
3. INDUCTANCE VALUES GREATER THAN ONE ARE IN MICROHENRIES, LESS THAN ONE ARE IN MILLIHENRIES.
4. PRESENCE OF ARROW INDICATES CLOCKWISE ROTATION

INDICATES SCREWDRIVER ADJUSTMENT

✱ INDICATES COMPONENTS NOT MOUNTED ON TB1



RACAL
AC POWER UNIT
/BATTERY CHARGER
DWG G-02535 C
SERIES 100

P1
-16 REG
3
1
2
POWER ON/OFF
15
13
14
EXTERAL GRD
4
9
-16 UNREG
7
POWER ON/OFF
8
6
5
E1
E2
C1 .02
C2 .02
R1 100K
C8 50uf
CR6 IN4816
Q6 2N3055
Q7 2N3055
R11 510 2W
R12 15 1/2 W
R13 15 1/2W
CR7 IN281
CR8 IN281
S1 12/24VDC
24V
12V
12V
24V
T1
5
4
3
2
1
9
7&8
6
12
11
10
F2 1A
E9
E10
E11
CR1
E3
CR2 IN916
CR3 IN916
C4 500uf
Q1 2N3242
R3 18K 1W
E7
E8
E9
E13
E12
E15
CR5
E14
E10
J1
J2
J3
+
-
BATTERY INPUT 12/24 VDC
F1 2A

UNLESS OTHERWISE NOTED:

1. RESISTOR VALUES ARE IN OHMS 1/4 WATT
   K = 1,000 M = 1,000,000
2. CAPACITOR VALUES GREATER THAN ONE ARE IN PICO FARADS, LESS THAN ONE ARE IN MICROFARADS.
3. INDUCTANCE VALUES GREATER THAN ONE ARE IN MICROHENRIES, LESS THAN ONE ARE IN MILLIHENRIES.
4. PRESENCE OF ARROW INDICATES CLOCKWISE ROTATION

INDICATES SCREWDRIVER ADJUSTMENT

* INDICATES COMPONENTS NOT MOUNTED ON TB1

BATTERY ON

BATTERY CHARGE

TB2

S2

*Q4 2N3614

E6

Q2 2N1189

E4

R9 330

R6 2.7K

R7 1K

C6 0.1

R10 1.2K

C7 100uf +

*VR2 IN2982RB

R8 2.2K

VR1 IN753A

R11 680 1/2W

R12 5.6K 1/2W

R13 5.6 1W

Q5 2N3055

CR6 IN538

*C4 50uf +

J1

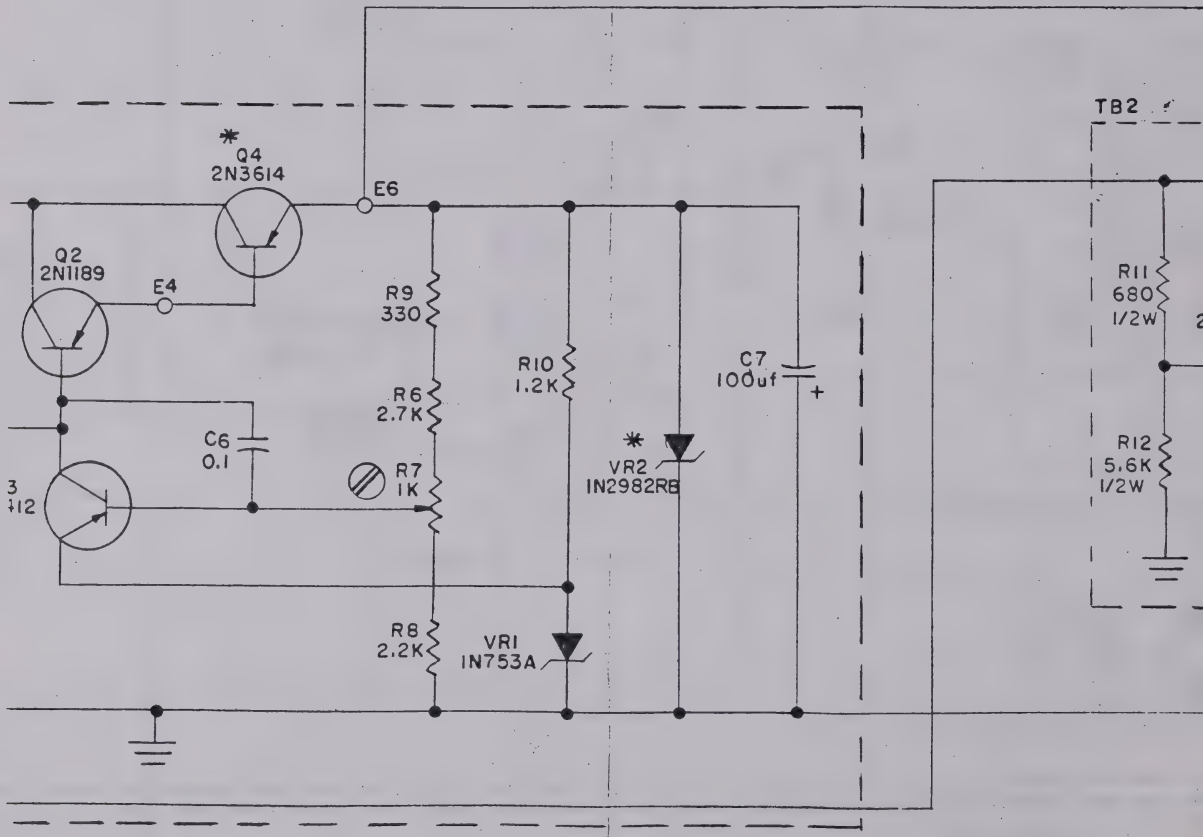
8 — -16V IN

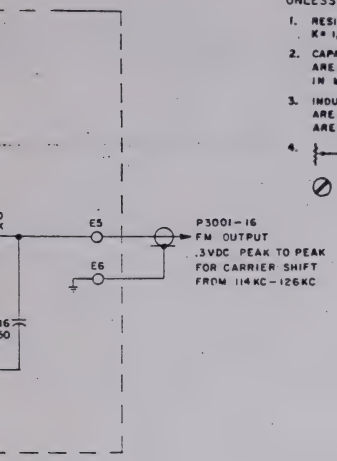
7 — TO BATTERY

4 — GRD

9 — GRD

RACAL
AC POWER UNIT
/BATTERY CHARGER
DWG G-02535 C
SERIES 100


TB2
* Q4 2N3614
E6
Q2 2N1189
E4
R9 330
R10 1.2K
C7 100uf
+
R6 2.7K
C6 0.1
R7 1K
* VR2 IN2982RB
R11 680 1/2W
R12 5.6K 1/2W
R8 2.2K
VR1 IN753A



UNLESS OTHERWISE NOTED:

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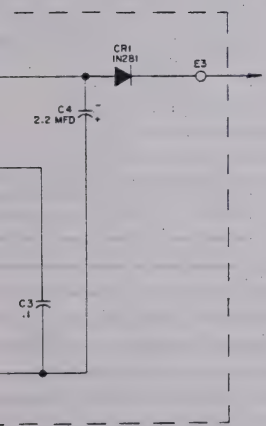
3. INDUCTANCE VALUES GREATER THAN ONE ARE IN MICROHENRIES, LESS THAN ONE ARE IN MILLIHENRIES.
4. PRESENCE OF ARROW INDICATES CLOCKWISE ROTATION

INDICATES SCREWDRIVER ADJUSTMENT

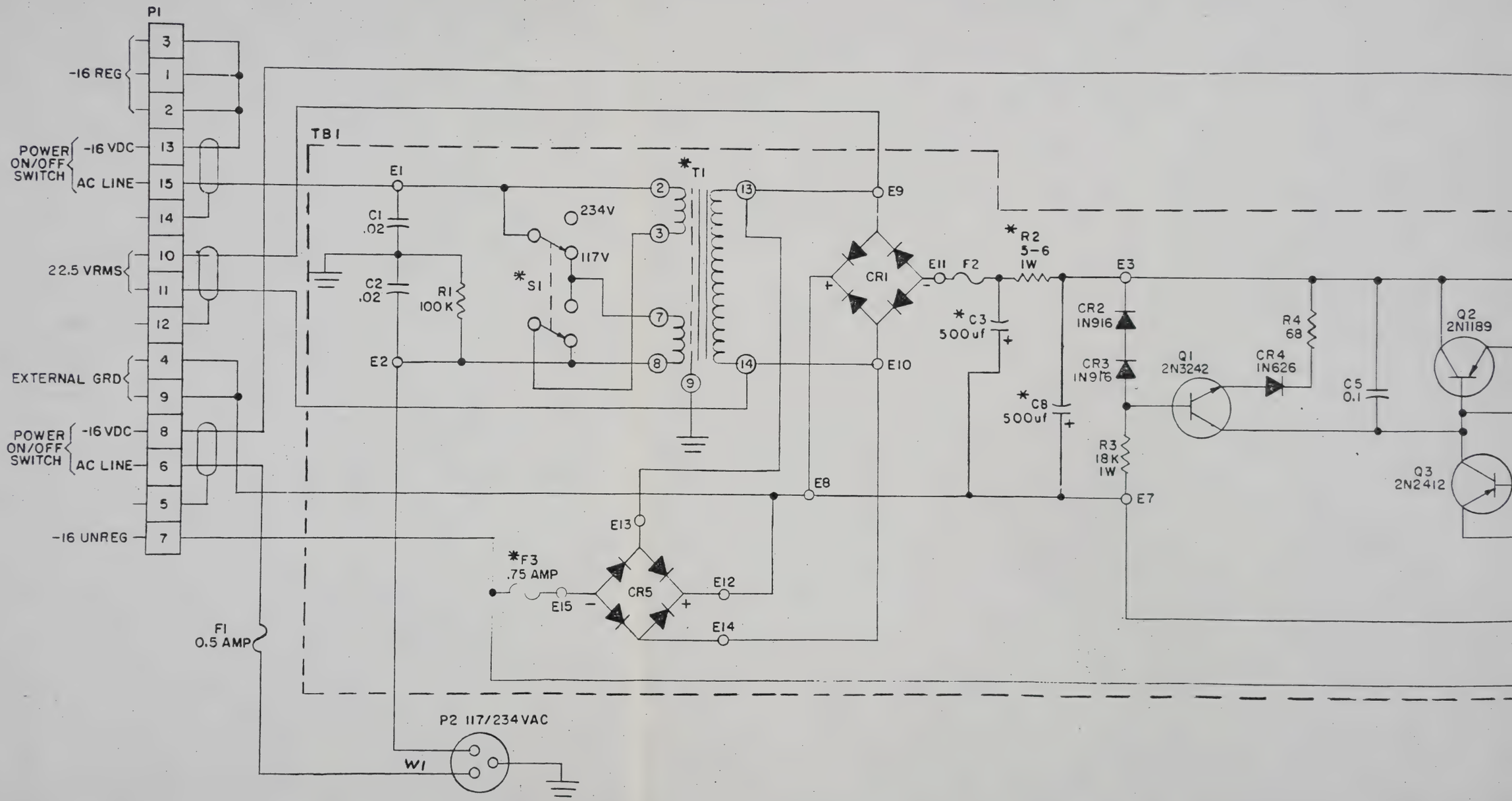
RACAL
FM DISC RA6217
DWG. NO. G-02027
SERIES 2900

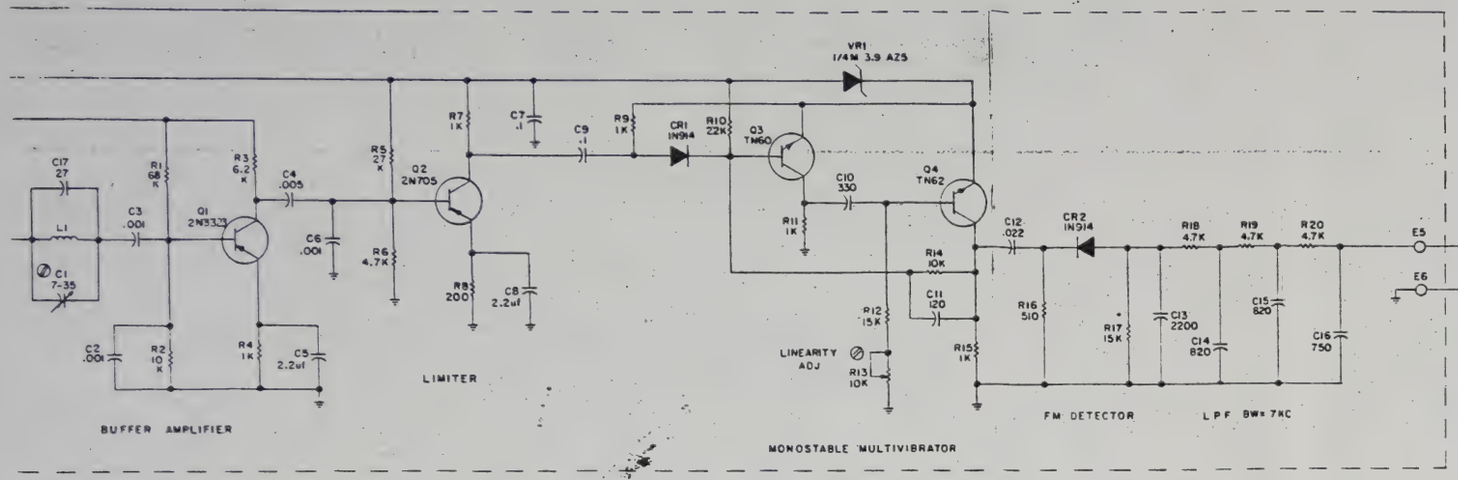


UNLESS OTHERWISE NOTED:

1. RESISTOR VALUES ARE IN OHMS 1/4 WATT
   K= 1,000 M= 1,000,000
2. CAPACITOR VALUES GREATER THAN ONE ARE IN PICO FARADS, LESS THAN ONE ARE IN MICROFARADS.
3. INDUCTANCE VALUES GREATER THAN ONE ARE IN MICROHENRIES, LESS THAN ONE ARE IN MILLIHENRIES.
4. PRESENCE OF ARROW INDICATES CLOCKWISE ROTATION
5. THIS CIRCUIT WILL NOT OSCILLATE PROPERLY UNTIL LOADED WITH 1000 PF CAPACITOR

RACAL RA6217
FM INSERTION OSC.
DWG NO. G-02030
SERIES 3100


P1
3
-16 REG
1
2
POWER ON/OFF SWITCH
-16 VDC
13
AC LINE
15
14
10
22.5 VRMS
11
12
4
EXTERNAL GRD
9
POWER ON/OFF SWITCH
-16 VDC
8
AC LINE
6
5
-16 UNREG
7
TB1
E1
C1 .02
C2 .02
R1 100K
E2
*S1
234V
117V
*T1
2
3
7
8
9
13
14
E9
E10
CR1
E11
F2
*R2 5-6 1W
E3
*C3 500uf
*C8 500uf
CR2 IN916
CR3 IN916
Q1 2N3242
CR4 IN626
R4 68
C5 0.1
Q2 2N1189
R3 18K 1W
E7
Q3 2N2412
E8
E13
*F3 .75 AMP
E15
CR5
E12
E14
F1 0.5 AMP
P2 117/234VAC
W1



UNLESS OTHERWISE NOTED:

1. RESISTOR VALUES ARE IN OHMS WATT
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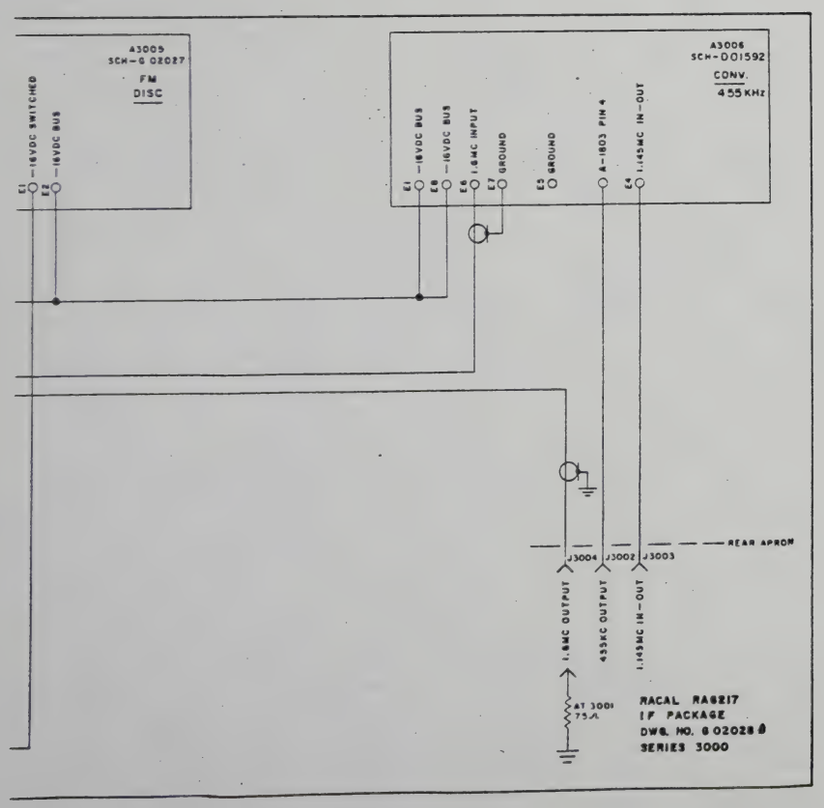
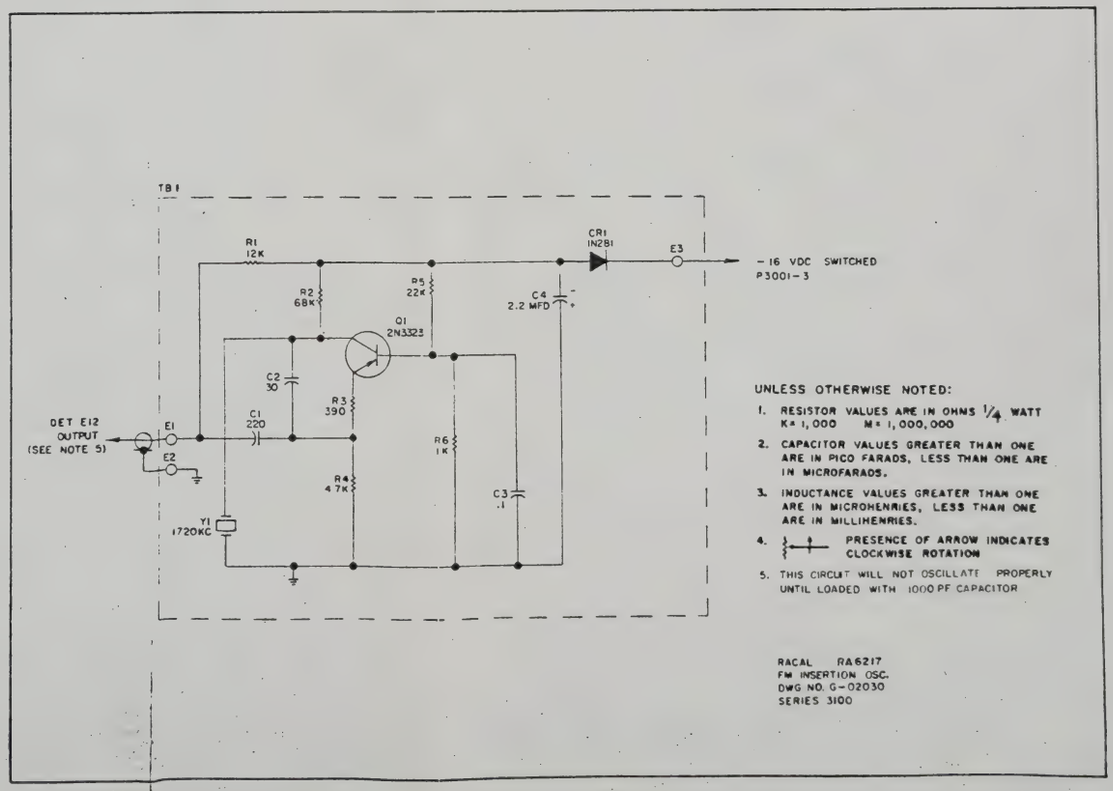
2. CAPACITOR VALUES GREATER THAN ONE ARE IN PICO FARADS, LESS THAN ONE ARE IN MICROFARADS.
3. INDUCTANCE VALUES GREATER THAN ONE ARE IN MICROHENRIES, LESS THAN ONE ARE IN MILLIHENRIES.
4. PRESENCE OF ARROW INDICATES CLOCKWISE ROTATION

⊘ INDICATES SCREWDRIVER ADJUSTMENT

RACAL
FM DISC RA6217
DWG. NO. G-02027
SERIES 2900

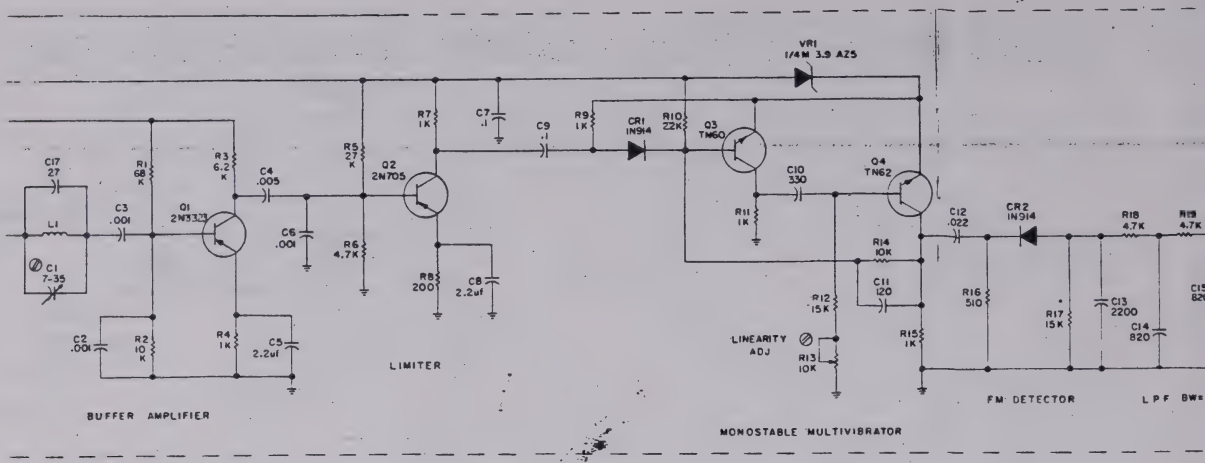


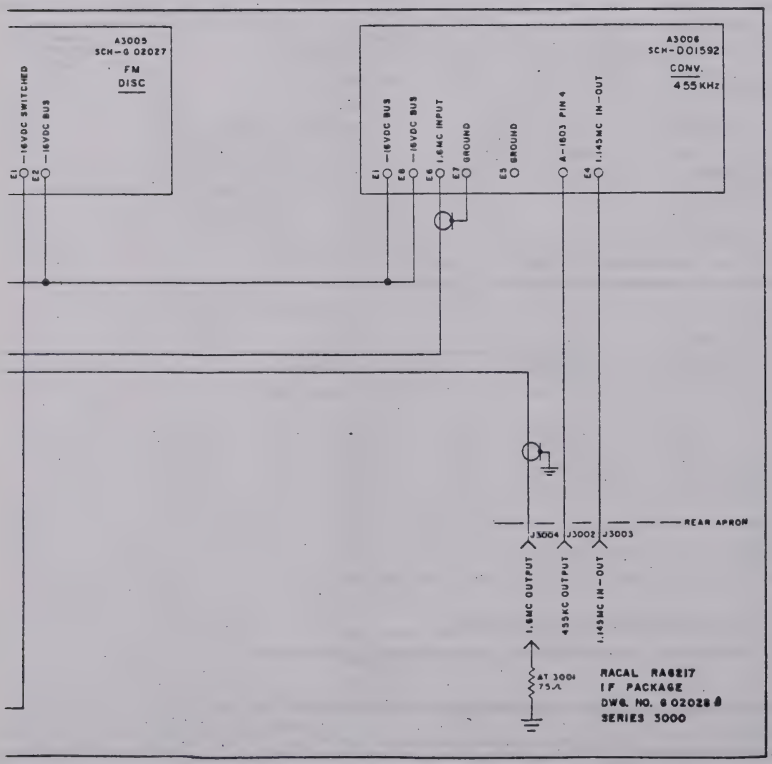


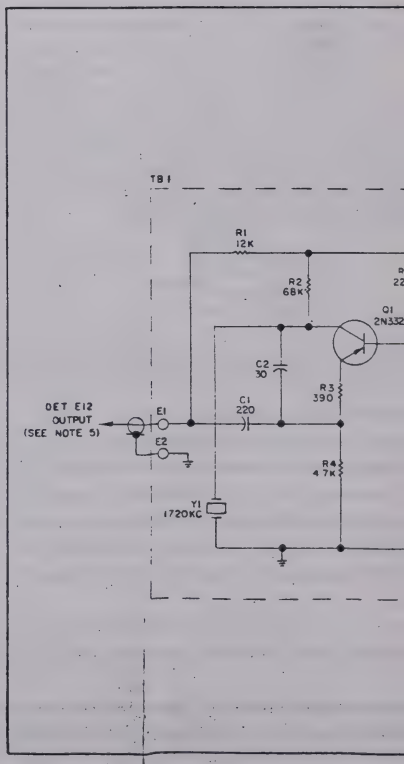
UNLESS OTHERWISE NOTED:

1. RESISTOR VALUES ARE IN OHMS 1/4 WATT
   K= 1,000 M= 1,000,000
2. CAPACITOR VALUES GREATER THAN ONE ARE IN PICO FARADS, LESS THAN ONE ARE IN MICROFARADS.
3. INDUCTANCE VALUES GREATER THAN ONE ARE IN MICROHENRIES, LESS THAN ONE ARE IN MILLIHENRIES.
4. PRESENCE OF ARROW INDICATES CLOCKWISE ROTATION
5. THIS CIRCUIT WILL NOT OSCILLATE PROPERLY UNTIL LOADED WITH 1000 PF CAPACITOR

RACAL RA6217
FM INSERTION OSC.
DWG NO. G-02030
SERIES 3100


VR1
1/4M 3.9 AZ5
C17
27
L1
C1
7-35
C3
.001
R1
68
K
Q1
2N3323
R3
6.2
K
C4
.005
C6
.001
C2
.001
R2
10
K
R4
1K
C5
2.2uf
BUFFER AMPLIFIER
R5
27
K
Q2
2N705
R6
4.7K
R7
1K
C7
.1
R8
200
C8
2.2uf
LIMITER
C9
.1
R9
1K
CR1
IN914
R10
22K
Q3
TN60
C10
330
R11
1K
Q4
TN62
R14
10K
C11
120
R12
15K
LINEARITY
ADJ
R13
10K
R15
1K
MONOSTABLE MULTIVIBRATOR
C12
.022
CR2
IN914
R16
510
R17
15K
R18
4.7K
C13
2200
C14
820
FM DETECTOR
L P F BW=

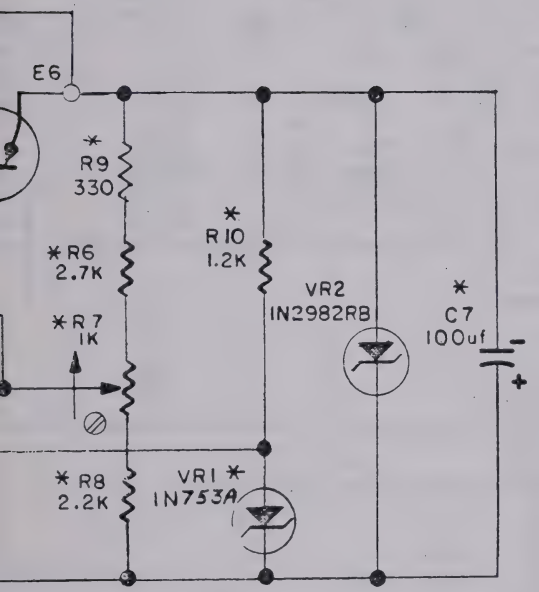

A3005
SCH-S 02027
FM
DISC
E1 — 16VDC SWITCHED
E2 — 16VDC BUS
A3006
SCH-001592
CONV.
455 KHz
E1 — 16VDC BUS
E5 — 16VDC BUS
E6 — 1.6MC INPUT
E7 — GROUND
E8 GROUND
A-1603 PIN 4
E4 — 1.145MC IN-OUT
REAR APRON
J3004
J3002
J3003
1.6MC OUTPUT
455KC OUTPUT
1.145MC IN-OUT
AT 3001
75Ω
RACAL RA6217
IF PACKAGE
DWG. NO. S 02028 B
SERIES 3000


TB1
R1
12K
R2
68K
Q1
2N3323
C2
30
R3
390
C1
220
DET E12
OUTPUT
(SEE NOTE 5)
E1
E2
R4
4.7K
Y1
1720KC

UNLESS OTHERWISE NOTED:

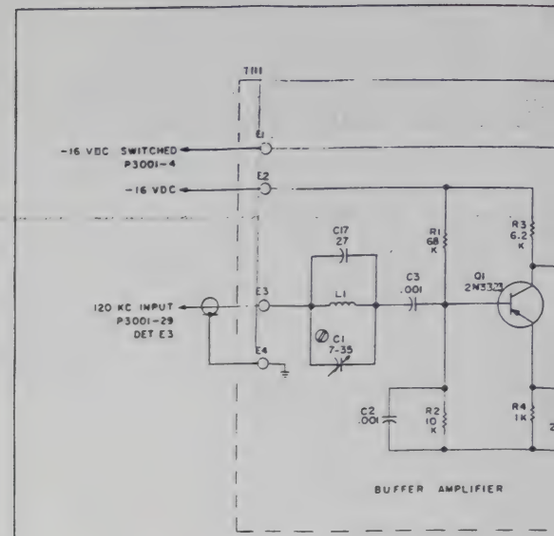
1. RESISTOR VALUES ARE IN OHMS $\frac{1}{4}$ WATT
   K = 1,000 M = 1,000,000
2. CAPACITOR VALUES GREATER THAN ONE ARE IN PICO FARADS, LESS THAN ONE ARE IN MICROFARADS.
3. INDUCTANCE VALUES GREATER THAN ONE ARE IN MICROHENRIES, LESS THAN ONE ARE IN MILLIHENRIES.
4. PRESENCE OF ARROW INDICATES CLOCKWISE ROTATION FOR INCREASE IN VOLTAGE

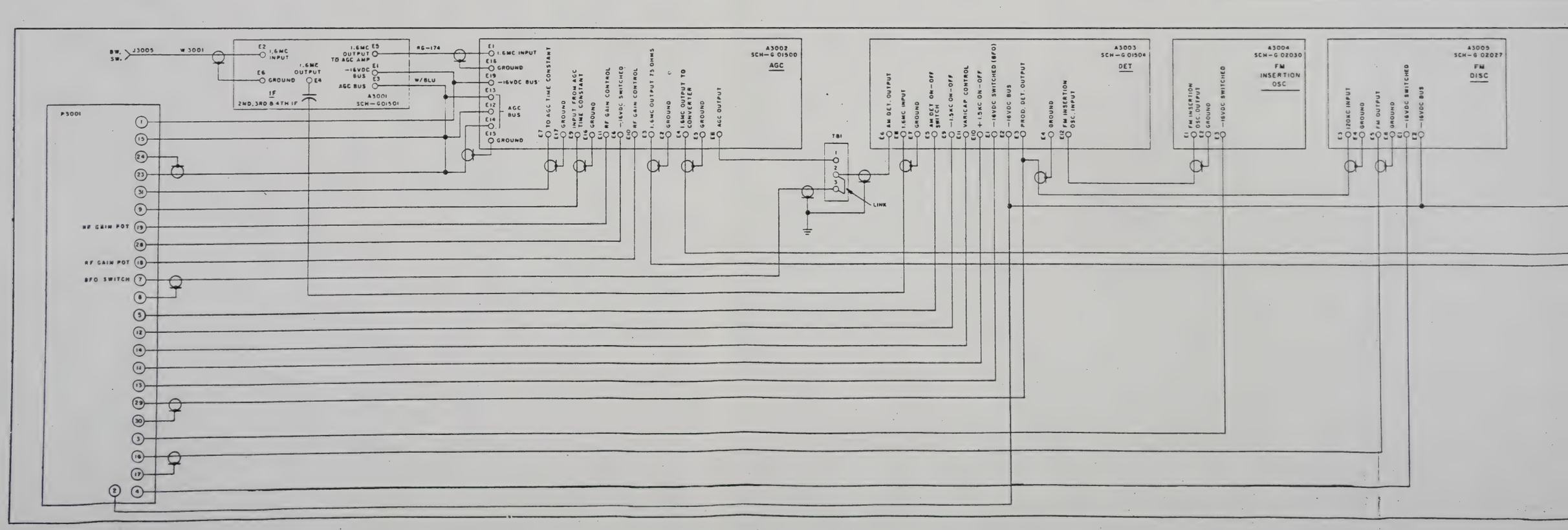
INDICATES SCREWDRIVER ADJUSTMENT



LOCATED

RACAL
POWER UNIT MA-6302
DWG NO. G-01311
PL = A-02088
SERIES NO. = 1300


TB1
E1
-16 VDC SWITCHED
P3001-4
E2
-16 VDC
C17
27
R1
68
K
R3
6.2
K
C3
.001
Q1
2N3323
E3
120 KC INPUT
P3001-29
DET E3
L1
C1
7-35
E4
C2
.001
R2
10
K
R4
1K
BUFFER AMPLIFIER


BW SW
J3005
W 3001
E2 1.6MC INPUT
E6 GROUND
1.6MC OUTPUT E4
IF
2ND, 3RD & 4TH IF
1.6MC E5 OUTPUT TO AGC AMP
-16VDC BUS E1
AGC BUS E3
A3001
SCH-G01501
RG-174
W/BLU
E1 1.6MC INPUT
E16 GROUND
E19 -16VDC BUS
E13
E12
E14
E15 GROUND
AGC BUS
A3002
SCH-G 01500
AGC
E7 TO AGC TIME CONSTANT
E17 GROUND
E8 INPUT FROM AGC
E16 TIME CONSTANT
E9 GROUND
E11 RF GAIN CONTROL
E6 -16VDC SWITCHED
E10 RF GAIN CONTROL
E2 1.6MC OUTPUT 75 OHMS
E2 GROUND
E4 1.6MC OUTPUT TO CONVERTER
E3 GROUND
E8 AGC OUTPUT
TB1
LINK
A3003
SCH-G 01504
DET
E6 AM DET. OUTPUT
E5 1.6MC INPUT
E7 GROUND
E3 AM DET ON-OFF SWITCH
E9 -1.5VC ON-OFF
E1 VARICAP CONTROL
E10 +1.5VC ON-OFF
E2 -16VDC SWITCHED (BFO)
E2 -16VDC BUS
E3 PROD. DET. OUTPUT
E4 GROUND
E3 FM INSERTION OSC. INPUT
A3004
SCH-G 02030
FM INSERTION OSC
E1 FM INSERTION OSC. OUTPUT
E2 GROUND
E3 -16VDC SWITCHED
A3005
SCH-G 02027
FM DISC
E3 120KC INPUT
E4 GROUND
E5 FM OUTPUT
E6 GROUND
E1 -16VDC SWITCHED
E2 -16VDC BUS
P3001
1
15
24
23
31
9
RF GAIN POT 19
28
RF GAIN POT 18
BFO SWITCH 7
8
5
12
14
11
13
29
30
3
16
17
2
4

UNLESS OTHERWISE NOTED:

1. RESISTOR VALUES ARE IN OHMS $\frac{1}{4}$ WATT
   K = 1,000 M = 1,000,000
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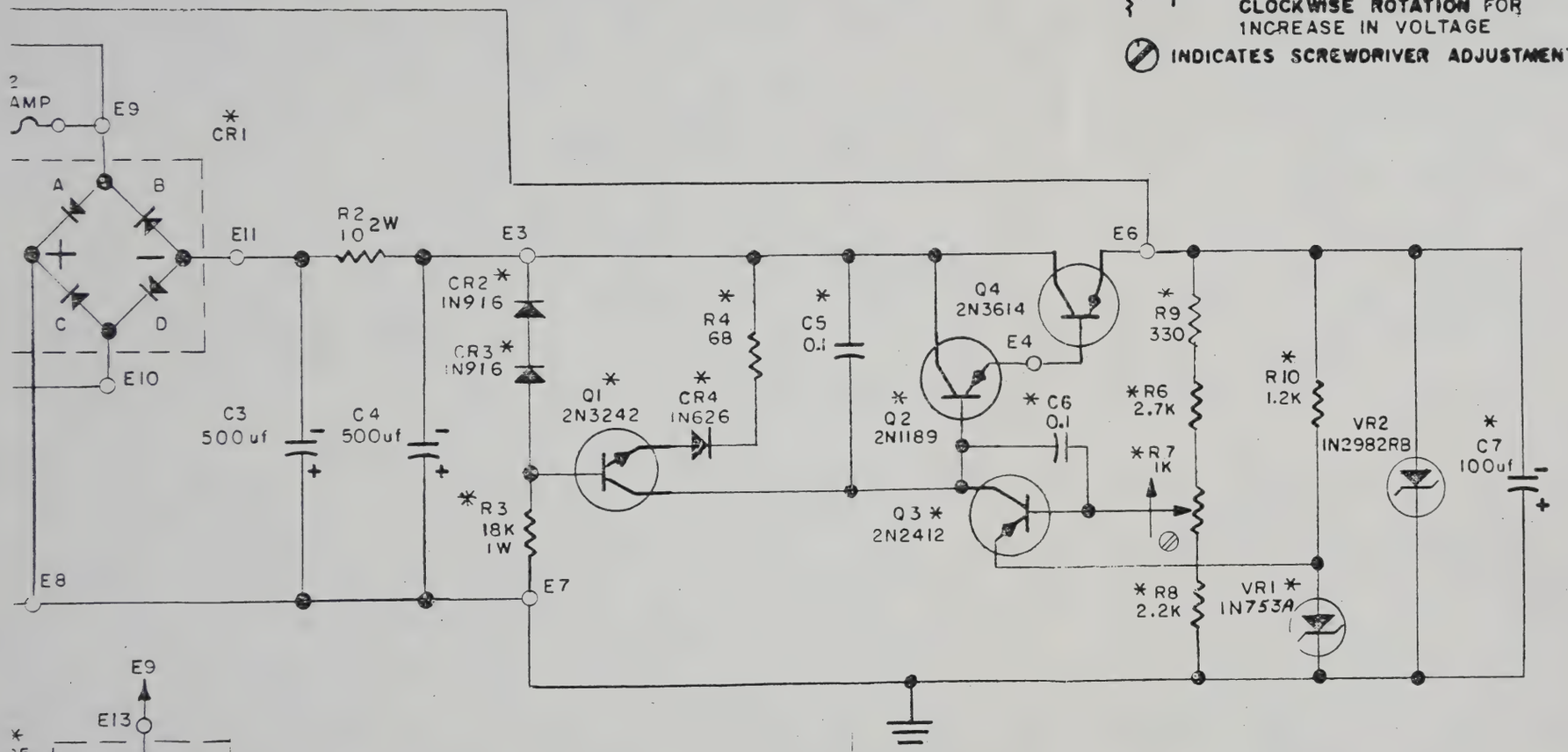
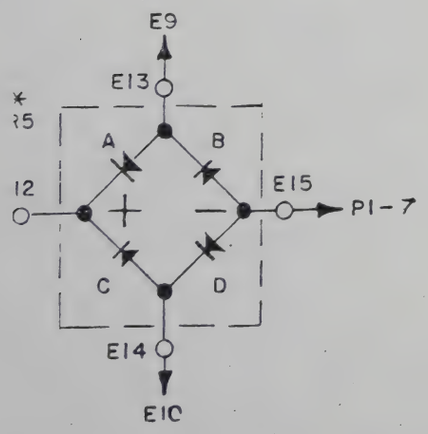
4. PRESENCE OF ARROW INDICATES CLOCKWISE ROTATION FOR INCREASE IN VOLTAGE

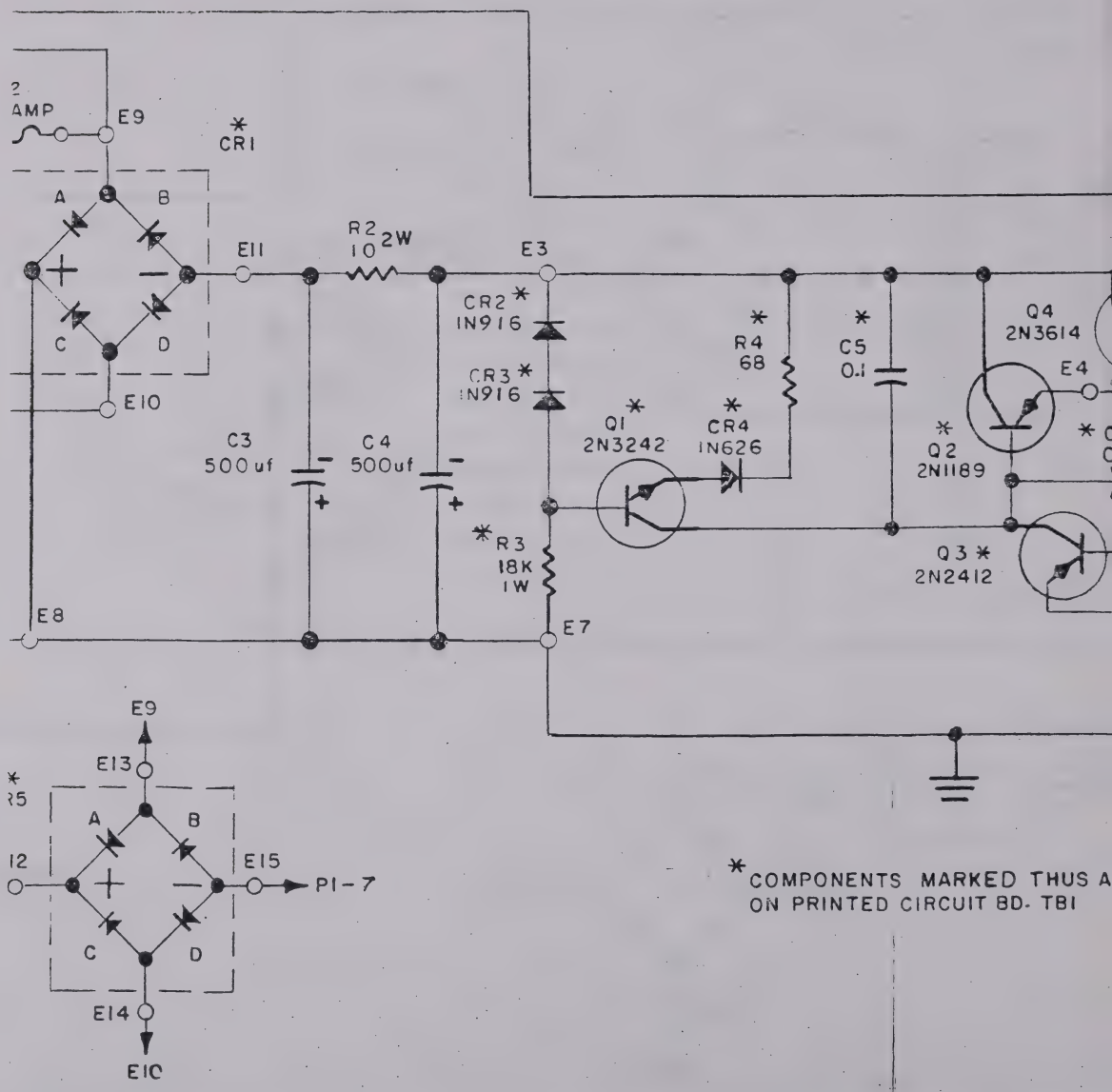
INDICATES SCREWDRIVER ADJUSTMENT



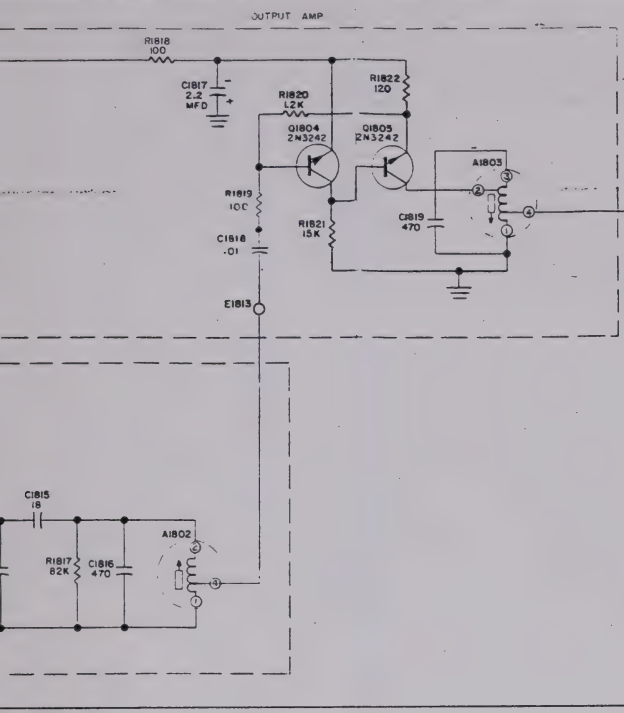


*COMPONENTS MARKED THUS ARE LOCATED ON PRINTED CIRCUIT BD. TBI

RACAL
POWER UNIT MA-6302
DWG NO. G-01311
PL = A-02088
SERIES NO. = 1300



*COMPONENTS MARKED THUS A
ON PRINTED CIRCUIT BD. TBI



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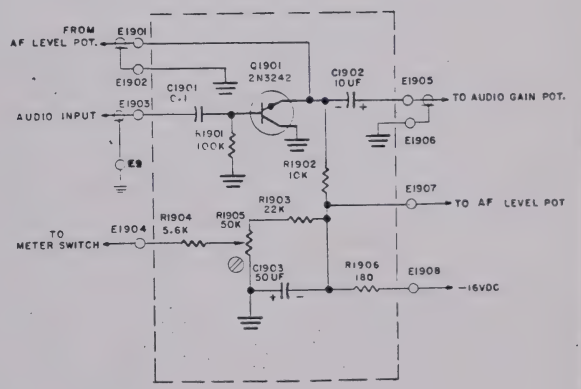
4. PRESENCE OF ARROW INDICATES CLOCKWISE ROTATION

INDICATES SCREWDRIVER ADJUSTMENT

RACAL RA6217
CONVERTER
DWG. NO. G01592C
SERIES 1800



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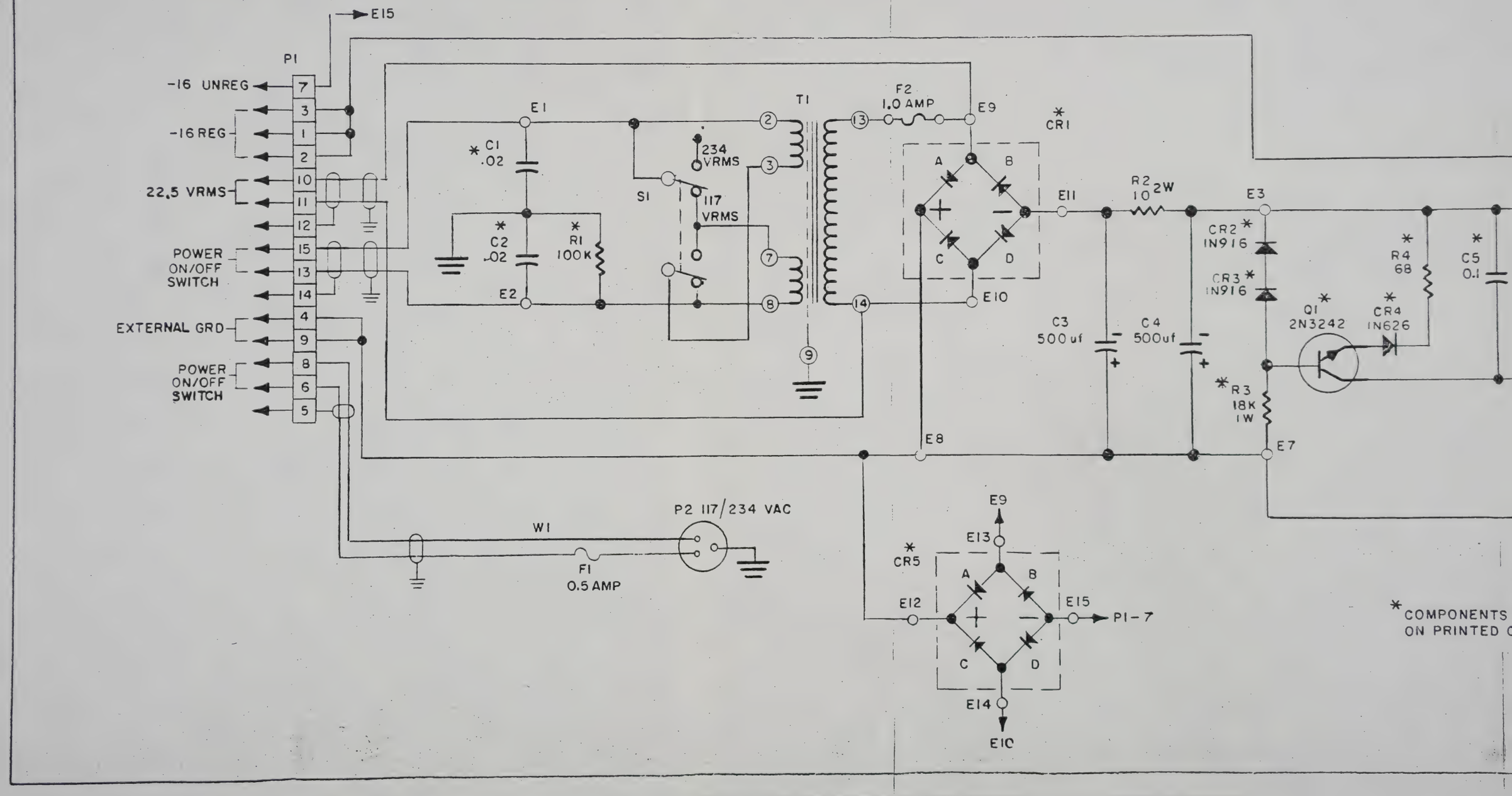
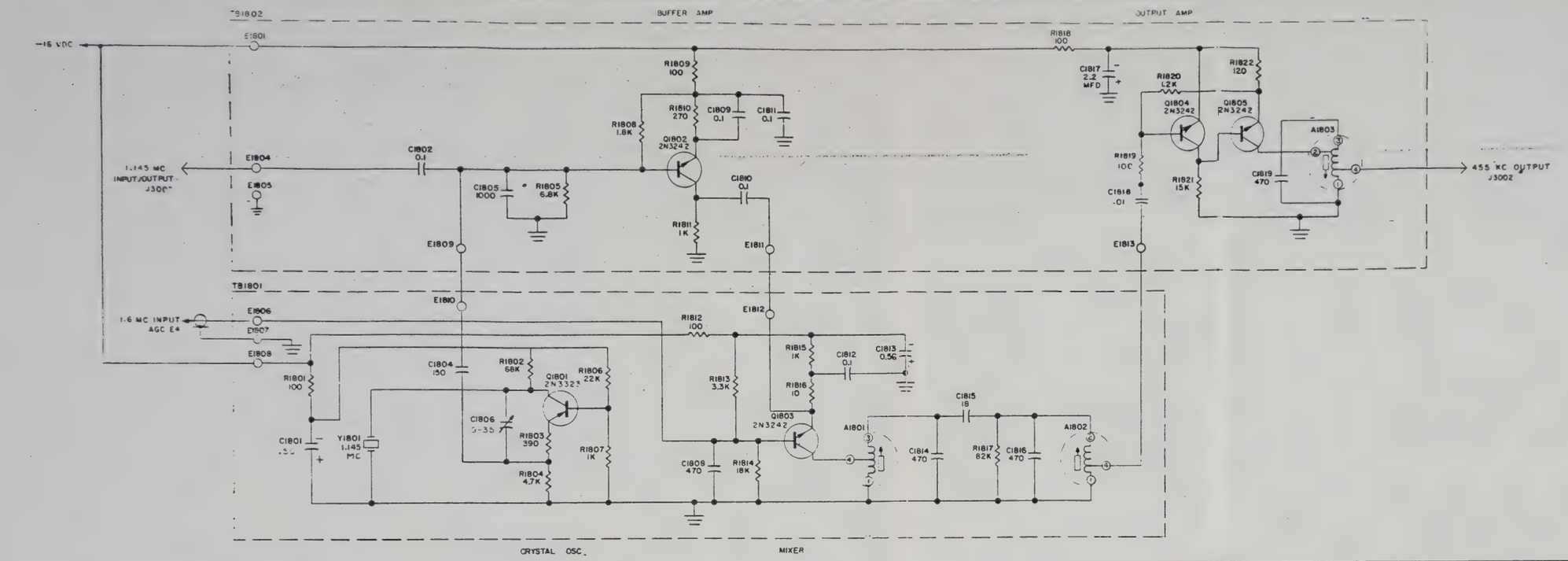
4. PRESENCE OF ARROW INDICATES CLOCKWISE ROTATION

INDICATES SCREWDRIVER ADJUSTMENT

RACAL RA6217
EMITTER FOLLOWER & METER ZERO
DWG. NO. G01758
SERIES 1900


P1
-16 UNREG
-16 REG
22.5 VRMS
POWER ON/OFF SWITCH
EXTERNAL GRD
POWER ON/OFF SWITCH
7
3
1
2
10
11
12
15
13
14
4
9
8
6
5
E15
E1
E2
*C1 .02
*C2 .02
*R1 100K
S1
234 VRMS
117 VRMS
T1
F2 1.0 AMP
E9
*CR1
A
B
C
D
E11
E10
R2 10 2W
E3
CR2 *IN916
CR3 *IN916
Q1 *2N3242
CR4 *IN626
*R4 68
*C5 0.1
C3 500 uf
C4 500uf
*R3 18K 1W
E7
E8
P2 117/234 VAC
W1
F1 0.5 AMP
E13
E12
E14
E16
*CR5
P1-7
*COMPONENTS
ON PRINTED C



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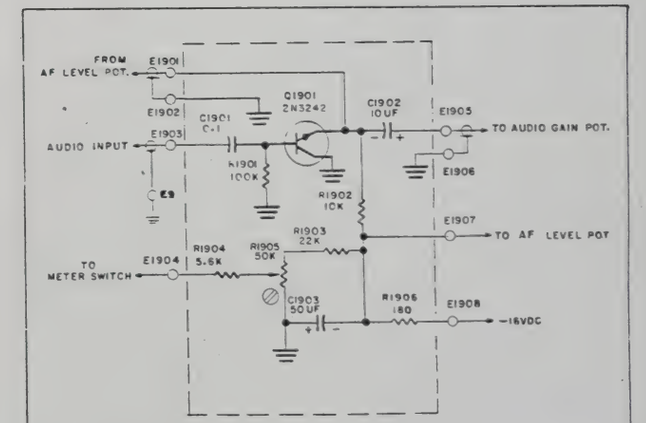
4. PRESENCE OF ARROW INDICATES CLOCKWISE ROTATION

⊘ INDICATES SCREWDRIVER ADJUSTMENT

RACAL RA6217
CONVERTER
DWG. NO. G01592C
SERIES 1800



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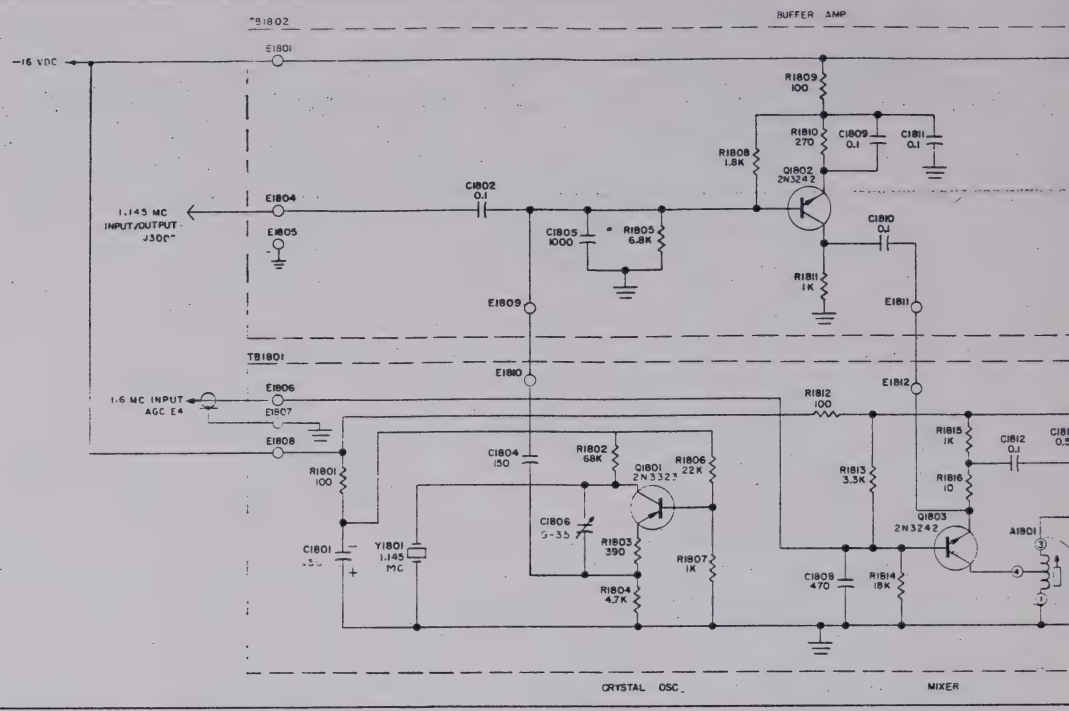
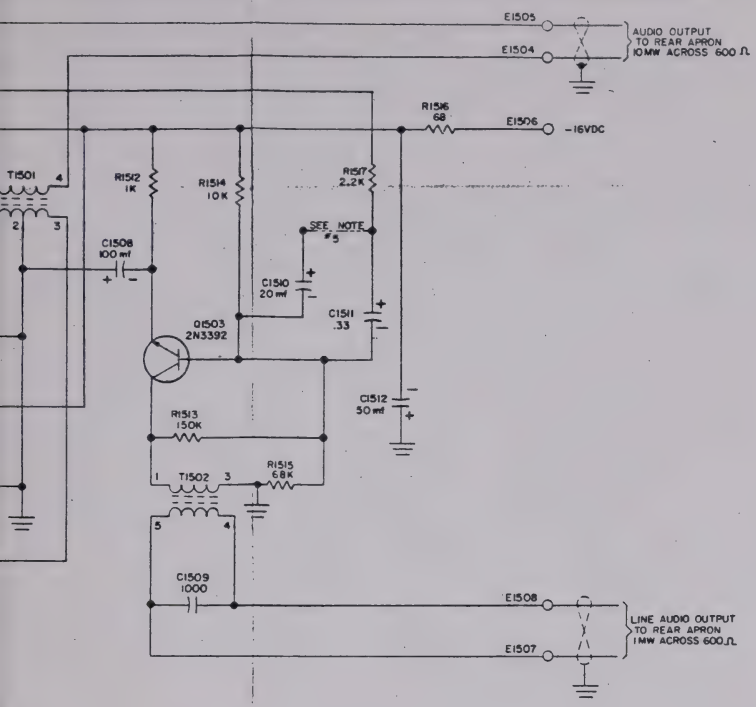
4. PRESENCE OF ARROW INDICATES CLOCKWISE ROTATION

⊘ INDICATES SCREWDRIVER ADJUSTMENT

RACAL RA6217
EMITTER FOLLOWER & METER ZERO
DWG. NO. G01758
SERIES 1900


TB1802
BUFFER AMP
-16 VDC
E1801
R1809 100
R1810 270
C1809 0.1
C1811 0.1
R1808 1.8K
Q1802 2N3242
E1804
1.145 MC INPUT/OUTPUT J300
E1805
C1802 0.1
C1805 1000
R1805 6.8K
C1810 0.1
R1811 1K
E1809
E1811
TB1801
E1810
E1812
E1806
1.6 MC INPUT AGC E4
E1807
E1808
R1812 100
R1815 1K
C1812 0.1
C1804 150
R1802 68K
Q1801 2N3323
R1806 22K
R1813 3.3K
R1816 10
R1801 100
C1806 5-35
Q1803 2N3242
A1901
C1801
Y1801 1.145 MC
R1803 390
R1807 1K
C1809 470
R1814 18K
R1804 4.7K
CRYSTAL OSC.
MIXER



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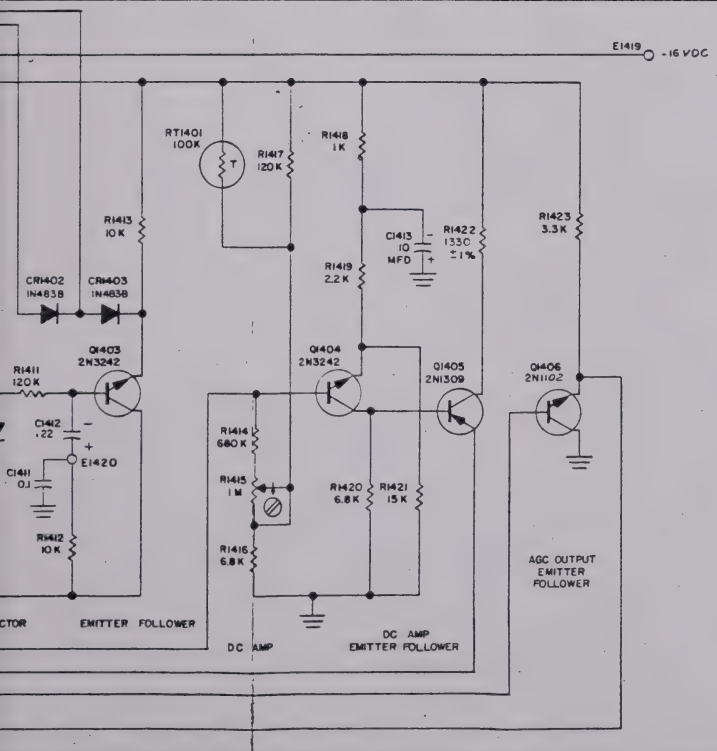
3. INDUCTANCE VALUES GREATER THAN ONE ARE IN MICROHENRIES, LESS THAN ONE ARE IN MILLIHENRIES.
4. PRESENCE OF ARROW INDICATES CLOCKWISE ROTATION

   INDICATES SCREWDRIVER ADJUSTMENT
5. LINK CONNECTED GIVES AUDIO RESPONSE DOWN TO 50 C.P.S.

RACAL RA6217
AUDIO AMP.
DWG. NO. G01499C
SERIES 1500



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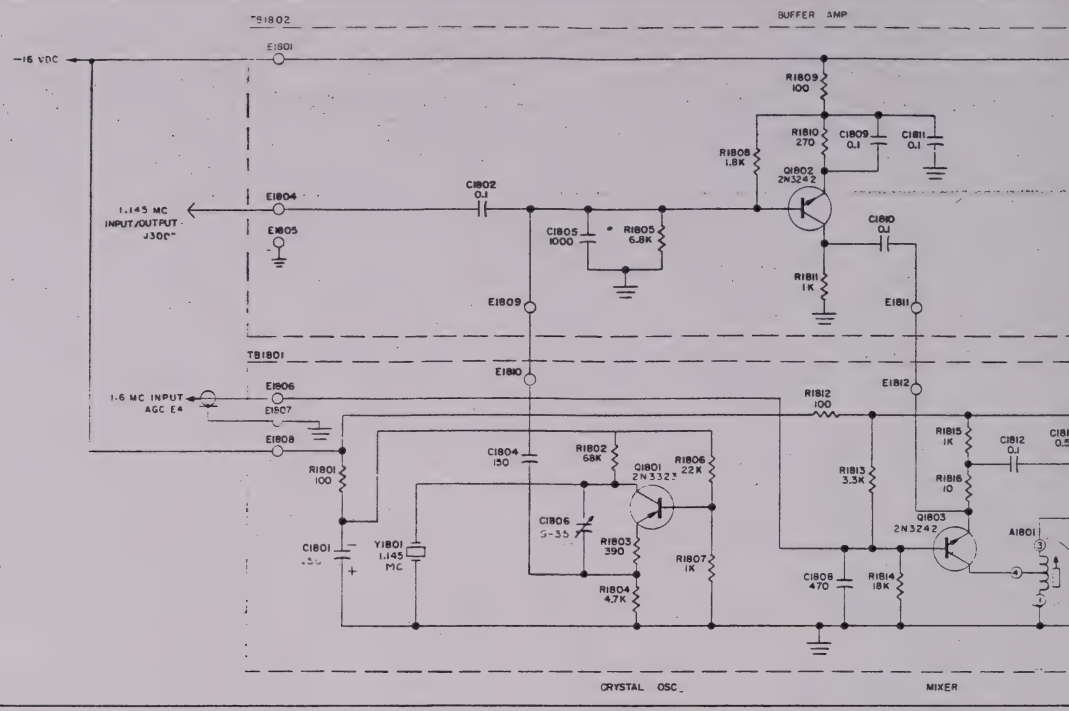
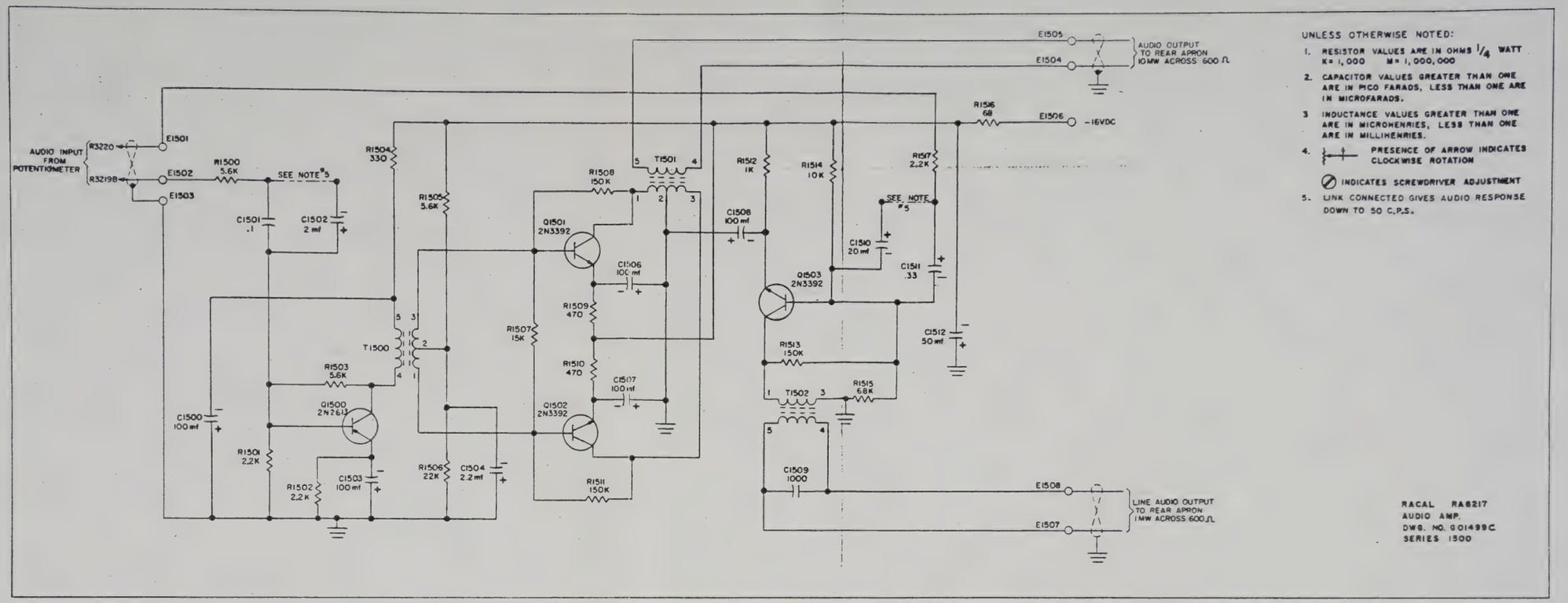
3. INDUCTANCE VALUES GREATER THAN ONE ARE IN MICROHENRIES, LESS THAN ONE ARE IN MILLIHENRIES.
4. PRESENCE OF ARROW INDICATES CLOCKWISE ROTATION

   INDICATES SCREWDRIVER ADJUSTMENT

RACAL RA6217
AGC
DWG. NO. G-01500C
SERIES 1400


TB1802
BUFFER AMP
-16 VDC
E1801
R1809 100
R1810 270
C1809 0.1
C1811 0.1
R1808 1.8K
Q1802 2N3242
C1802 0.1
E1804
1.145 MC INPUT/OUTPUT J300
E1805
C1805 1000
R1805 6.8K
C1810 0.1
R1811 1K
E1809
E1811
TB1801
E1810
E1812
1.6 MC INPUT AGC E4
E1806
E1807
E1808
R1812 100
R1815 1K
C1812 0.1
R1801 100
C1804 150
R1802 68K
Q1801 2N3323
R1806 22K
R1813 3.3K
R1816 10
C1806 G-35
R1803 390
Q1803 2N3242
A1801
C1801
Y1801 1.145 MC
R1807 1K
C1808 470
R1814 18K
R1804 4.7K
CRYSTAL OSC.
MIXER



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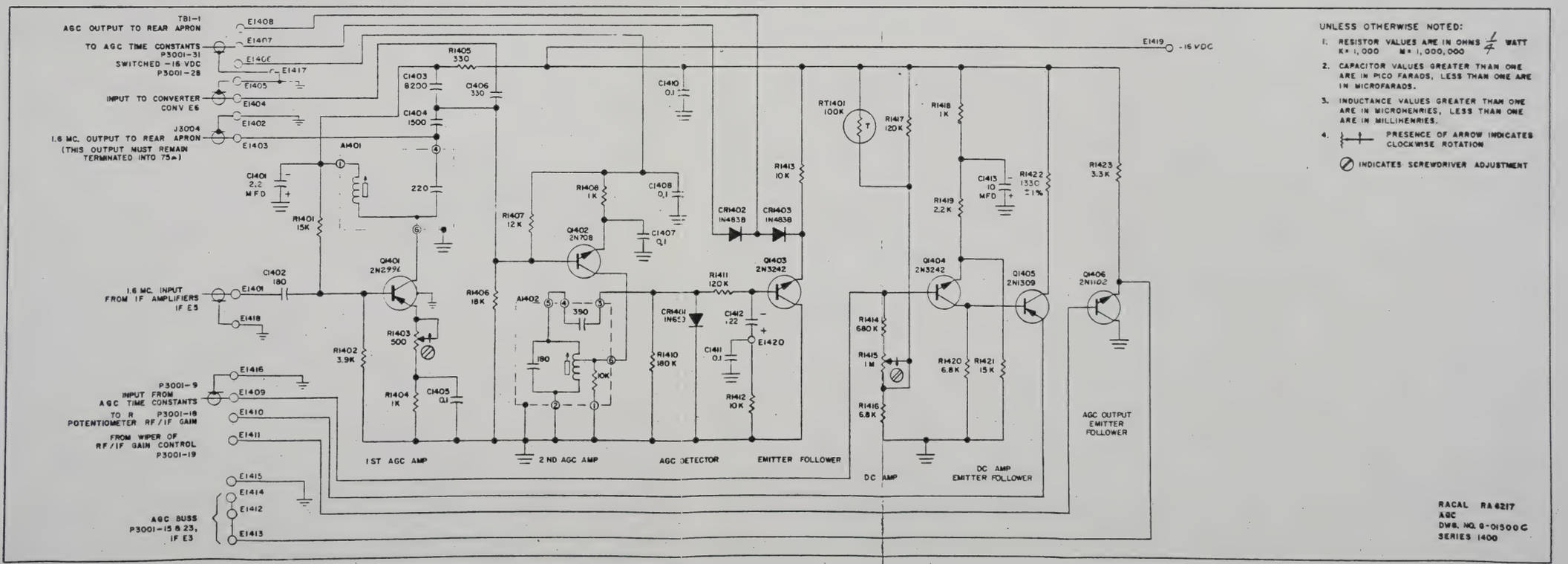
4. PRESENCE OF ARROW INDICATES CLOCKWISE ROTATION

   INDICATES SCREWDRIVER ADJUSTMENT
5. LINK CONNECTED GIVES AUDIO RESPONSE DOWN TO 50 C.P.S.

RACAL RA6217
AUDIO AMP.
DWG. NO. G01499C
SERIES 1500



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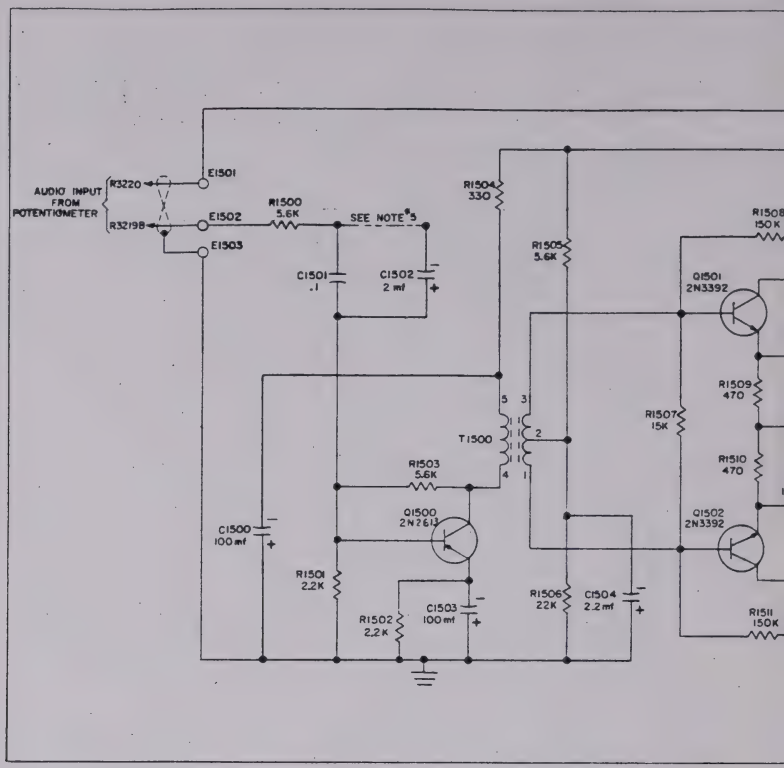
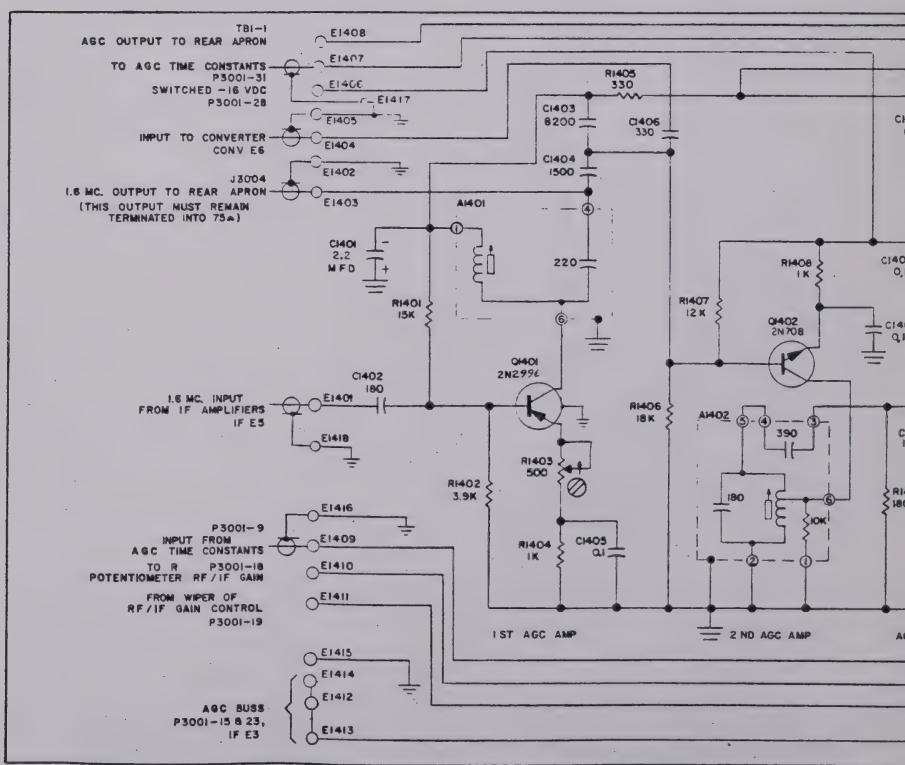
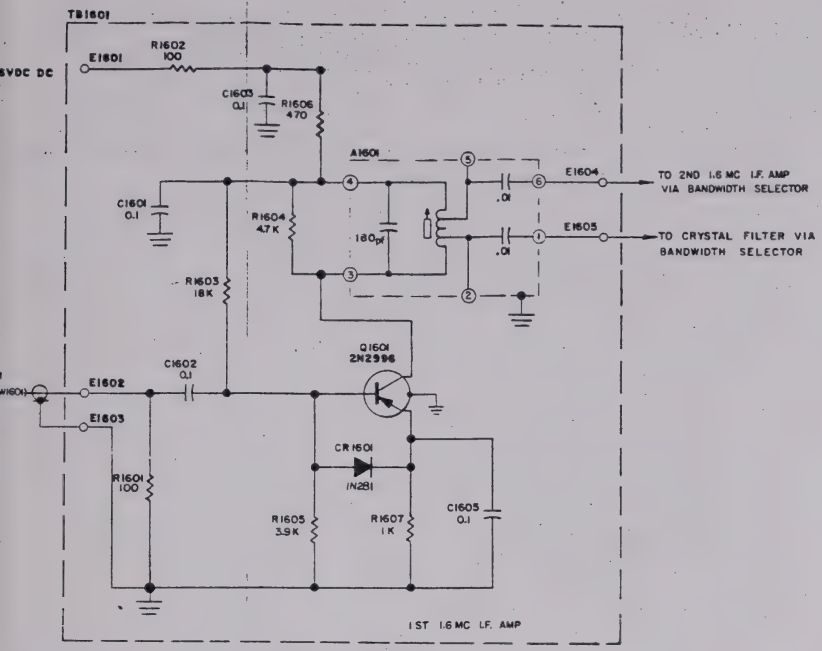
4. PRESENCE OF ARROW INDICATES CLOCKWISE ROTATION

   INDICATES SCREWDRIVER ADJUSTMENT

RACAL RA6217
AGC
DWG. NO. G-01500C
SERIES 1400


AUDIO INPUT FROM POTENTIOMETER
R3220
R32198
E1501
E1502
E1503
R1500 5.6K
SEE NOTE *5
C1501 .1
C1502 2 mf
R1504 330
R1505 5.6K
R1508 150K
Q1501 2N3392
R1509 470
R1507 15K
T1500
R1510 470
R1503 5.6K
Q1500 2N2613
Q1502 2N3392
C1500 100 mf
R1501 2.2K
R1502 2.2K
C1503 100 mf
R1506 22K
C1504 2.2 mf
R1511 150K


TB1-1 AGC OUTPUT TO REAR APRON
TO AGC TIME CONSTANTS P3001-31
SWITCHED -16 VDC P3001-28
INPUT TO CONVERTER CONV E6
J3004 1.6 MC. OUTPUT TO REAR APRON (THIS OUTPUT MUST REMAIN TERMINATED INTO 75Ω)
1.6 MC. INPUT FROM IF AMPLIFIERS IF E5
P3001-9 INPUT FROM AGC TIME CONSTANTS
TO R P3001-18 POTENTIOMETER RF/IF GAIN
FROM WIPER OF RF/IF GAIN CONTROL P3001-19
AGC BUSS P3001-15 & 23, IF E3
E1408
E1407
E1406
E1417
E1405
E1404
E1402
E1403
E1401
E1418
E1416
E1409
E1410
E1411
E1415
E1414
E1412
E1413
R1405 330
C1403 8200
C1406 330
C1404 1500
A1401
C1401 2.2 MFD
220
R1401 15K
R1408 1K
R1407 12K
Q1402 2N708
Q1401 2N2996
C1402 180
R1406 18K
A1402
390
R1403 500
R1402 3.9K
180
10K
R1404 1K
C1405 .01
1ST AGC AMP
2 ND AGC AMP



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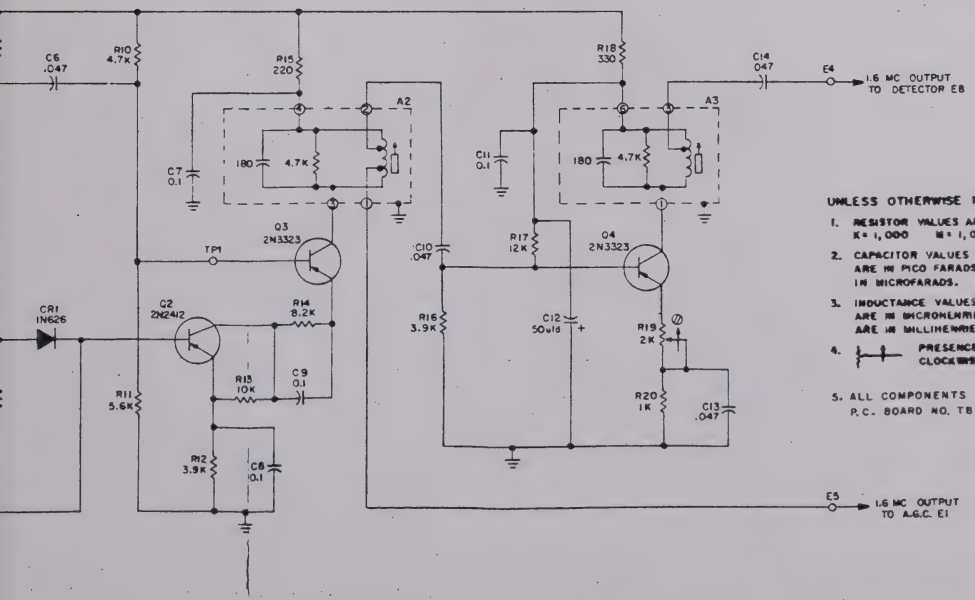
4. PRESENCE OF ARROW INDICATES CLOCKWISE ROTATION

INDICATES SCREWDRIVER ADJUSTMENT

RACAL RA6217
IF UNIT
DWG. NO. G01508
SERIES 1600



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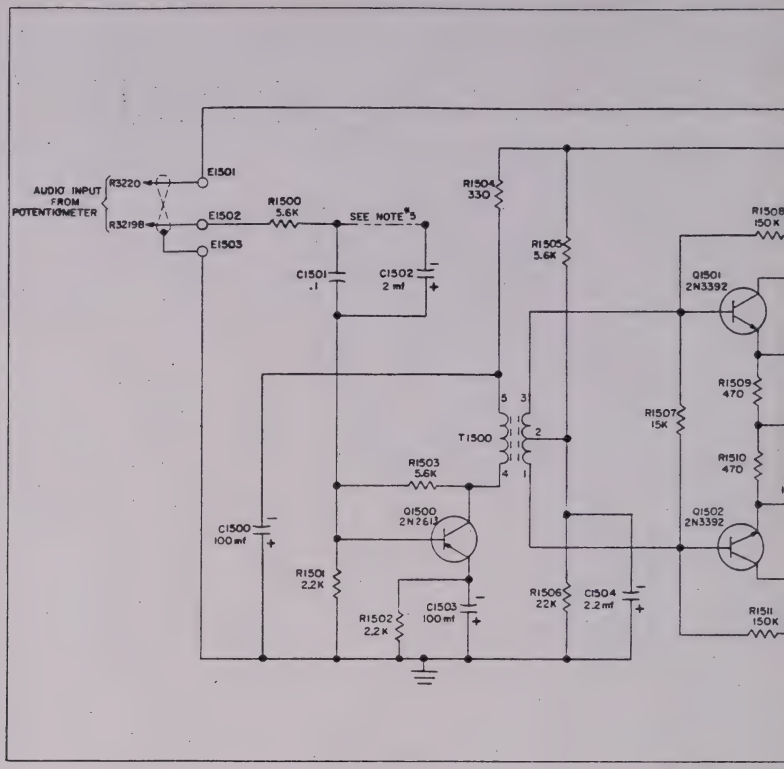
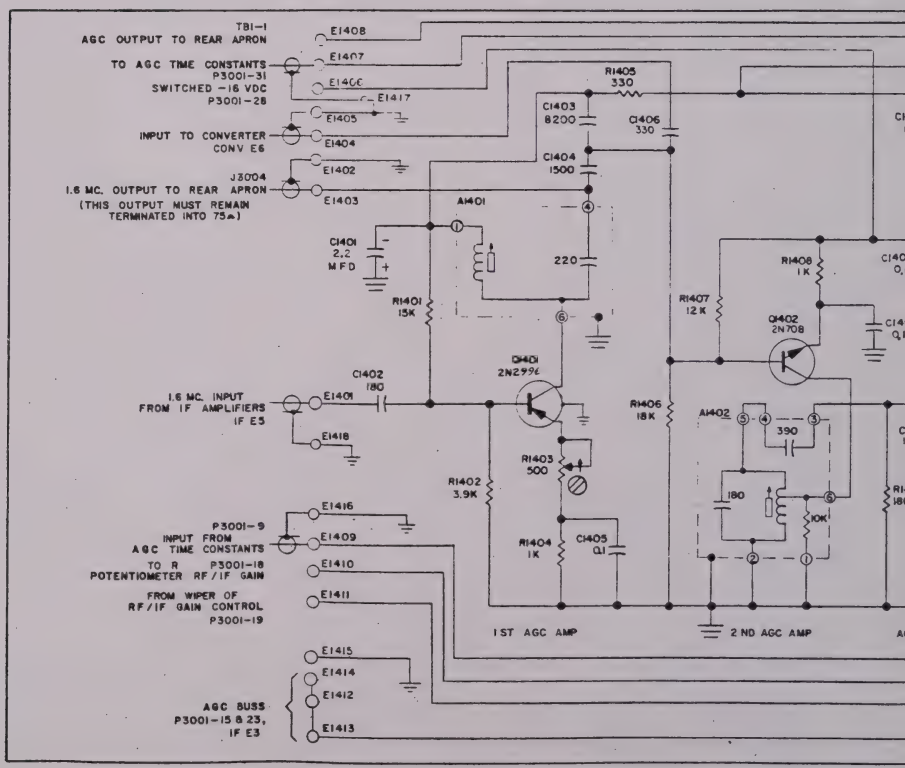
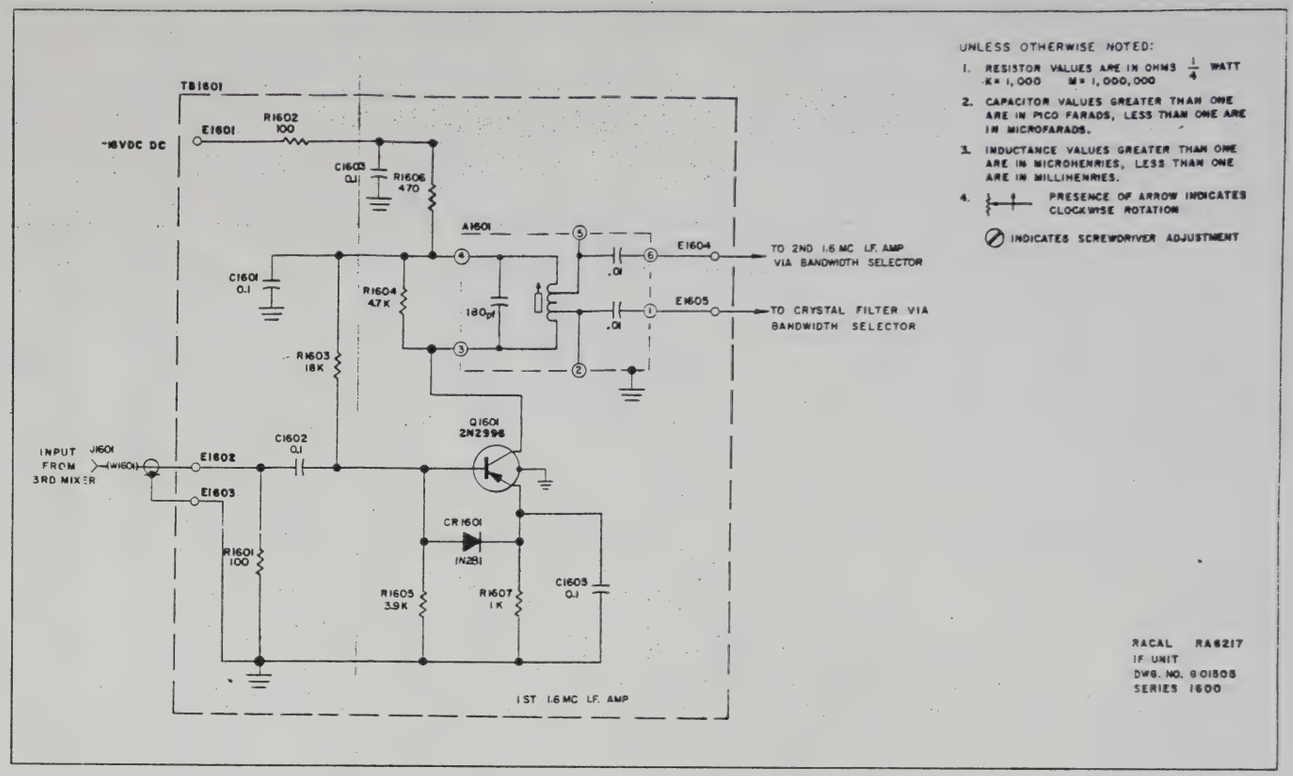
3. INDUCTANCE VALUES GREATER THAN ONE ARE IN MICROHENRIES, LESS THAN ONE ARE IN MILLIHENRIES.
4. PRESENCE OF ARROW INDICATES CLOCKWISE ROTATION
5. ALL COMPONENTS ARE ASSEMBLED ON P.C. BOARD NO. TB1

RACAL RA6217
2ND, 3RD, 4TH
I.F. AMP
DWG NO. G-01501
SERIES 1700


AUDIO INPUT FROM POTENTIOMETER
R3220
R3198
E1501
E1502
E1503
R1500 5.6K
SEE NOTE "5"
C1501 .1
C1502 2 mf
R1504 330
R1505 5.6K
R1508 150K
Q1501 2N3392
R1509 470
R1507 15K
T1500
R1510 470
R1503 5.6K
Q1500 2N2613
Q1502 2N3392
C1500 100 mf
R1501 2.2K
R1502 2.2K
C1503 100 mf
R1506 22K
C1504 2.2 mf
R1511 150K


TB1-1 AGC OUTPUT TO REAR APRON
TO AGC TIME CONSTANTS P3001-31
SWITCHED -18 VDC P3001-28
INPUT TO CONVERTER CONV E6
J3004 1.6 MC. OUTPUT TO REAR APRON (THIS OUTPUT MUST REMAIN TERMINATED INTO 75Ω)
E1408
E1407
E1406
E1417
E1405
E1404
E1402
E1403
A1401
C1401 2.2 MFD
C1403 8200
C1404 1500
C1406 330
R1405 330
220
R1401 15K
R1408 1K
R1407 12K
Q1402 2N708
Q1401 2N2996
C1402 180
1.6 MC. INPUT FROM IF AMPLIFIERS IF E5
E1401
E1418
R1406 18K
A1402
390
R1403 500
180
10K
R1402 3.9K
R1404 1K
C1405 .01
P3001-9 INPUT FROM AGC TIME CONSTANTS
TO R P3001-18 POTENTIOMETER RF/IF GAIN
FROM WIPER OF RF/IF GAIN CONTROL P3001-19
E1416
E1409
E1410
E1411
1ST AGC AMP
2 ND AGC AMP
E1415
E1414
E1412
E1413
AGC BUSS P3001-15 & 23, IF E3

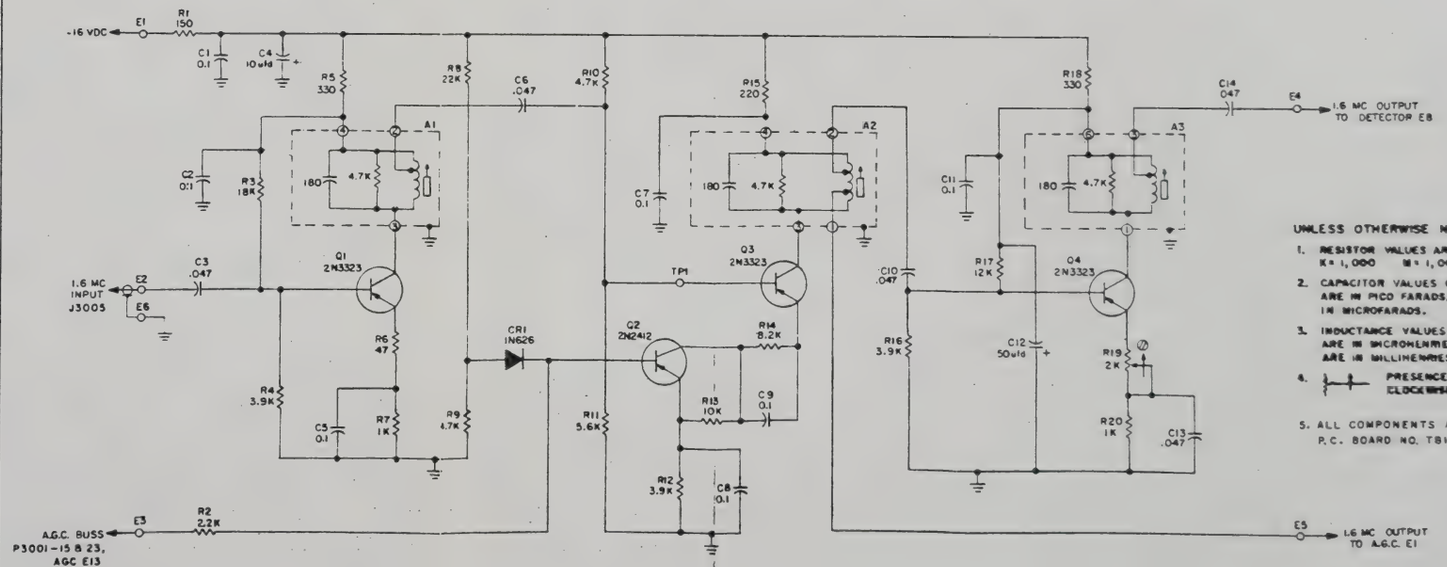


UNLESS OTHERWISE NOTED:

1. RESISTOR VALUES ARE IN OHMS $\frac{1}{4}$ WATT K = 1,000 M = 1,000,000
2. CAPACITOR VALUES GREATER THAN ONE ARE IN PICO FARADS, LESS THAN ONE ARE IN MICROFARADS.
3. INDUCTANCE VALUES GREATER THAN ONE ARE IN MICROHENRIES, LESS THAN ONE ARE IN MILLIHENRIES.
4. PRESENCE OF ARROW INDICATES CLOCKWISE ROTATION

INDICATES SCREWDRIVER ADJUSTMENT

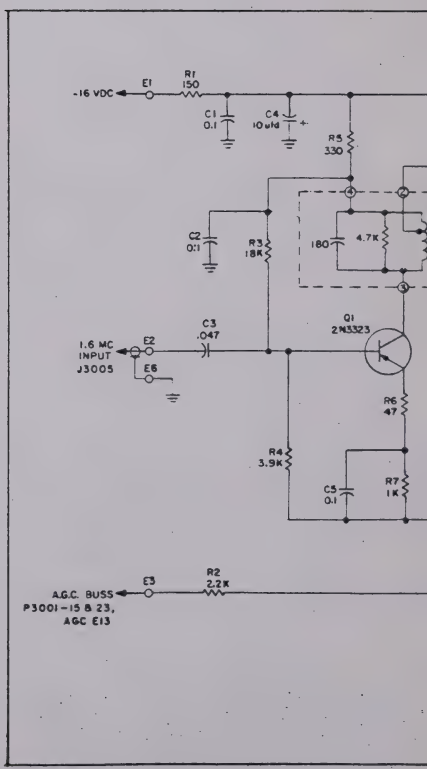
RACAL RA6217
I.F. UNIT
DWG. NO. G-01508
SERIES 1600

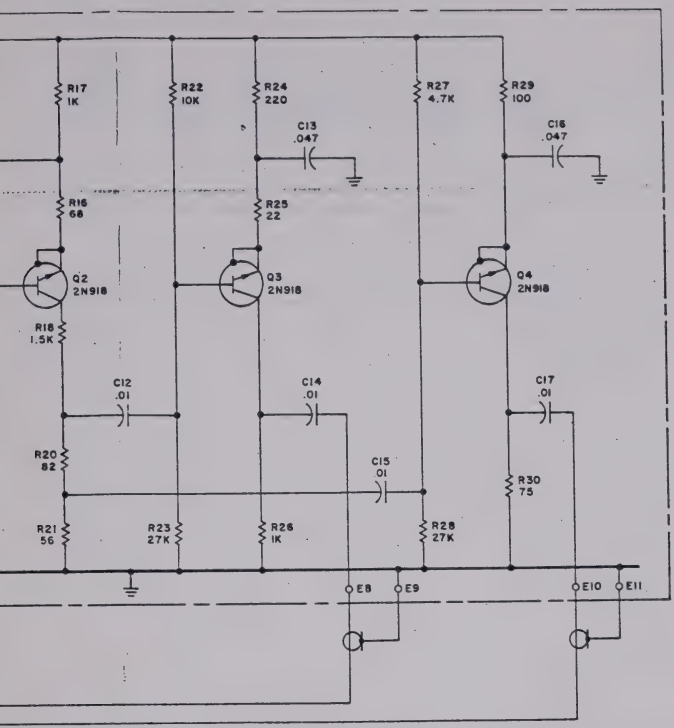


UNLESS OTHERWISE NOTED:

1. RESISTOR VALUES ARE IN OHMS 1/4 WATT K = 1,000 M = 1,000,000
2. CAPACITOR VALUES GREATER THAN ONE ARE IN PICO FARADS, LESS THAN ONE ARE IN MICROFARADS.
3. INDUCTANCE VALUES GREATER THAN ONE ARE IN MICROHENRIES, LESS THAN ONE ARE IN MILLIHENRIES.
4. PRESENCE OF ARROW INDICATES CLOCKWISE ROTATION
5. ALL COMPONENTS ARE ASSEMBLED ON P.C. BOARD NO. TB1

RACAL RA6217
2ND, 3RD, 4TH
I.F. AMP
DWG NO. G-01501
SERIES 1700


-16 VDC
E1
R1
150
C1
0.1
C4
10 uFd
R5
330
C2
0.1
R3
18K
180
4.7K
C3
.047
1.6 MC
INPUT
J3005
E2
E6
Q1
2N3323
R6
47
R4
3.9K
C5
0.1
R7
1K
R2
2.2K
E3
A.G.C. BUSS
P3001-15 & 23,
AGC E13



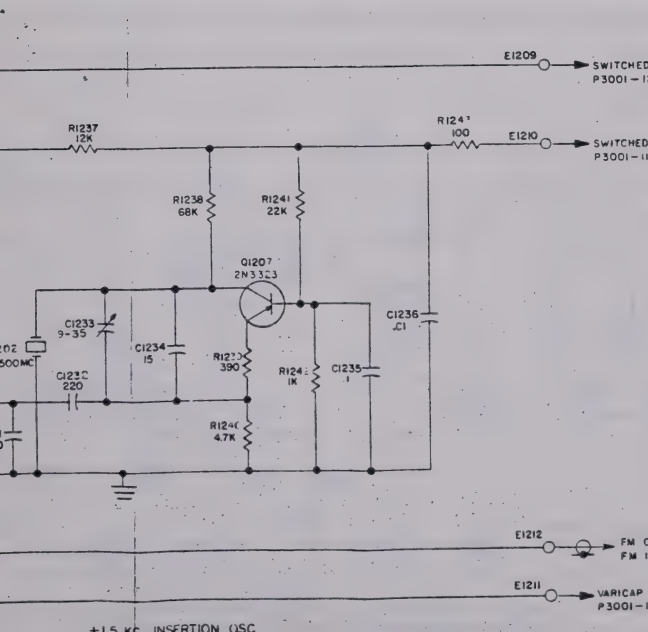
UNLESS OTHERWISE NOTED:

1. RESISTOR VALUES ARE IN OHMS 1/4 WATT
   K = 1,000 M = 1,000,000
2. CAPACITOR VALUES GREATER THAN ONE ARE IN PICO FARADS, LESS THAN ONE ARE IN MICROFARADS.
3. INDUCTANCE VALUES GREATER THAN ONE ARE IN MICROHENRIES, LESS THAN ONE ARE IN MILLIHENRIES.
4. PRESENCE OF ARROW INDICATES CLOCKWISE ROTATION

INDICATES SCREWDRIVER ADJUSTMENT

*PRESENCE OF ASTERISK INDICATES COMPONENT IS NOT MOUNTED ON THE BOARD.

RACAL RA 6217
2ND V.F.O.
DWG. NO. G-01309 J
SERIES 1000

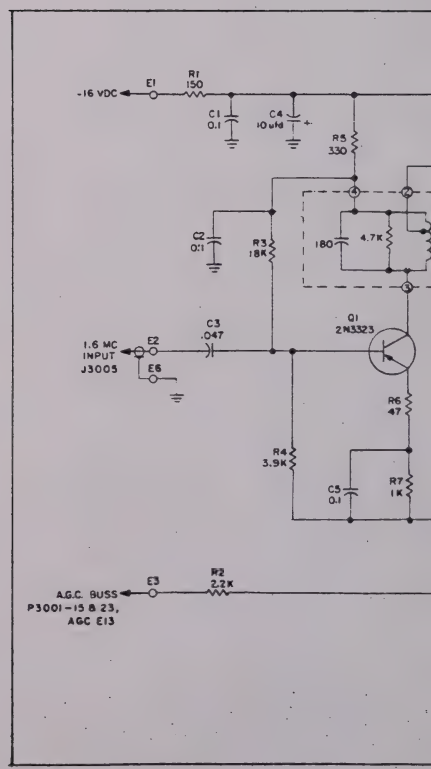


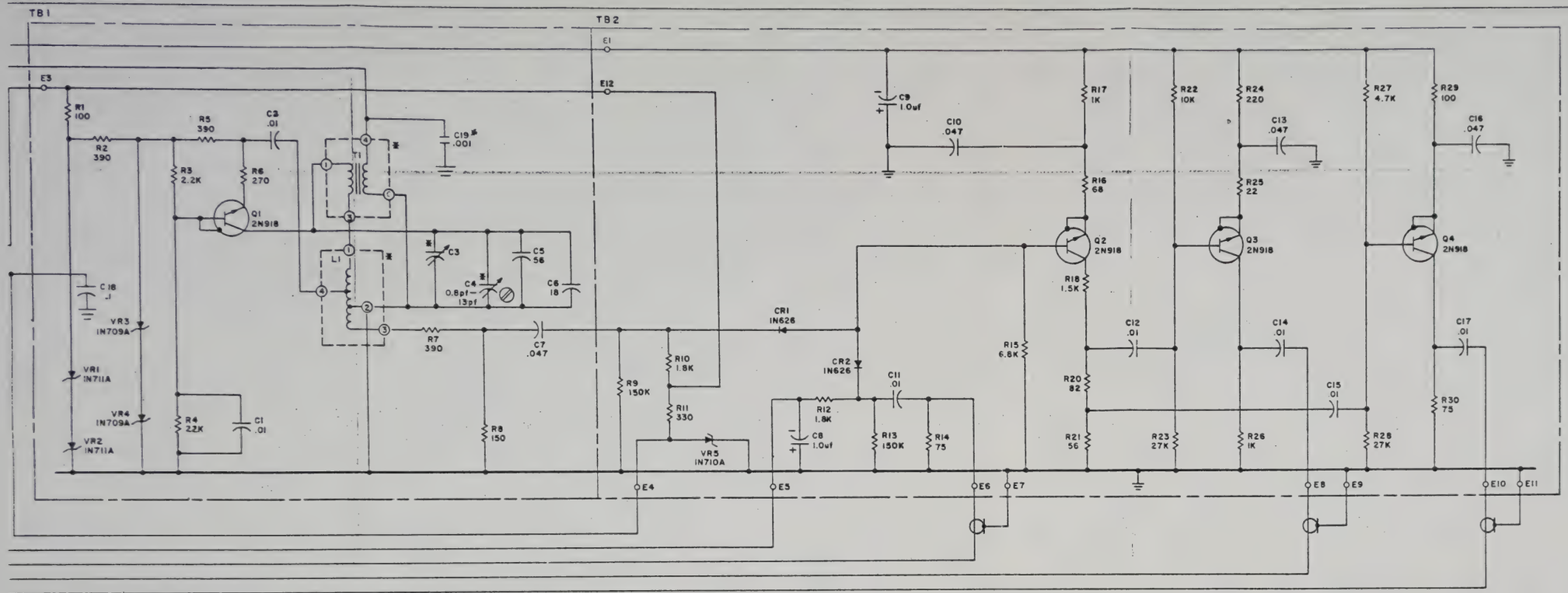
UNLESS OTHERWISE NOTED:

1. RESISTOR VALUES ARE IN OHMS 1/4 WATT
   K = 1,000 M = 1,000,000
2. CAPACITOR VALUES GREATER THAN ONE ARE IN PICO FARADS, LESS THAN ONE ARE IN MICROFARADS.
3. INDUCTANCE VALUES GREATER THAN ONE ARE IN MICROHENRIES, LESS THAN ONE ARE IN MILLIHENRIES.
4. PRESENCE OF ARROW INDICATES CLOCKWISE ROTATION

INDICATES SCREWDRIVER ADJUSTMENT

RACAL
DETECTOR BD RA 6217
DWG. NO. G-01504
SERIES 1200


-16 VDC
E1
R1
150
C1
0.1
C4
10 uFd
R5
330
C2
0.1
R3
18K
180
4.7K
C3
.047
1.6 MC
INPUT
J3005
E2
E6
Q1
2N3323
R6
47
R4
3.9K
C5
0.1
R7
1K
R2
2.2K
E3
A.G.C. BUSS
P3001-15 & 23,
AGC E13



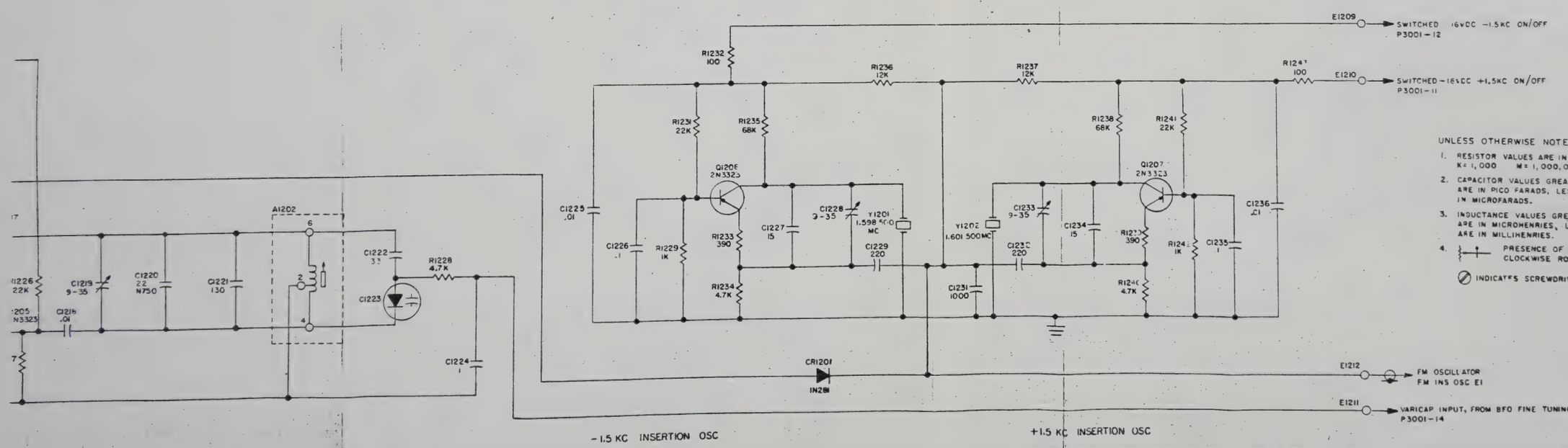
UNLESS OTHERWISE NOTED:

1. RESISTOR VALUES ARE IN OHMS 1/4 WATT K= 1,000 M= 1,000,000
2. CAPACITOR VALUES GREATER THAN ONE ARE IN PICO FARADS, LESS THAN ONE ARE IN MICROFARADS.
3. INDUCTANCE VALUES GREATER THAN ONE ARE IN MICROHENRIES, LESS THAN ONE ARE IN MILLIHENRIES.
4. PRESENCE OF ARROW INDICATES CLOCKWISE ROTATION

INDICATES SCREWDRIVER ADJUSTMENT

*PRESENCE OF ASTERISK INDICATES COMPONENT IS NOT MOUNTED ON THE BOARD.

RACAL RA 6217
2ND V.F.O.
DWG. NO. G-01309 J
SERIES 1000

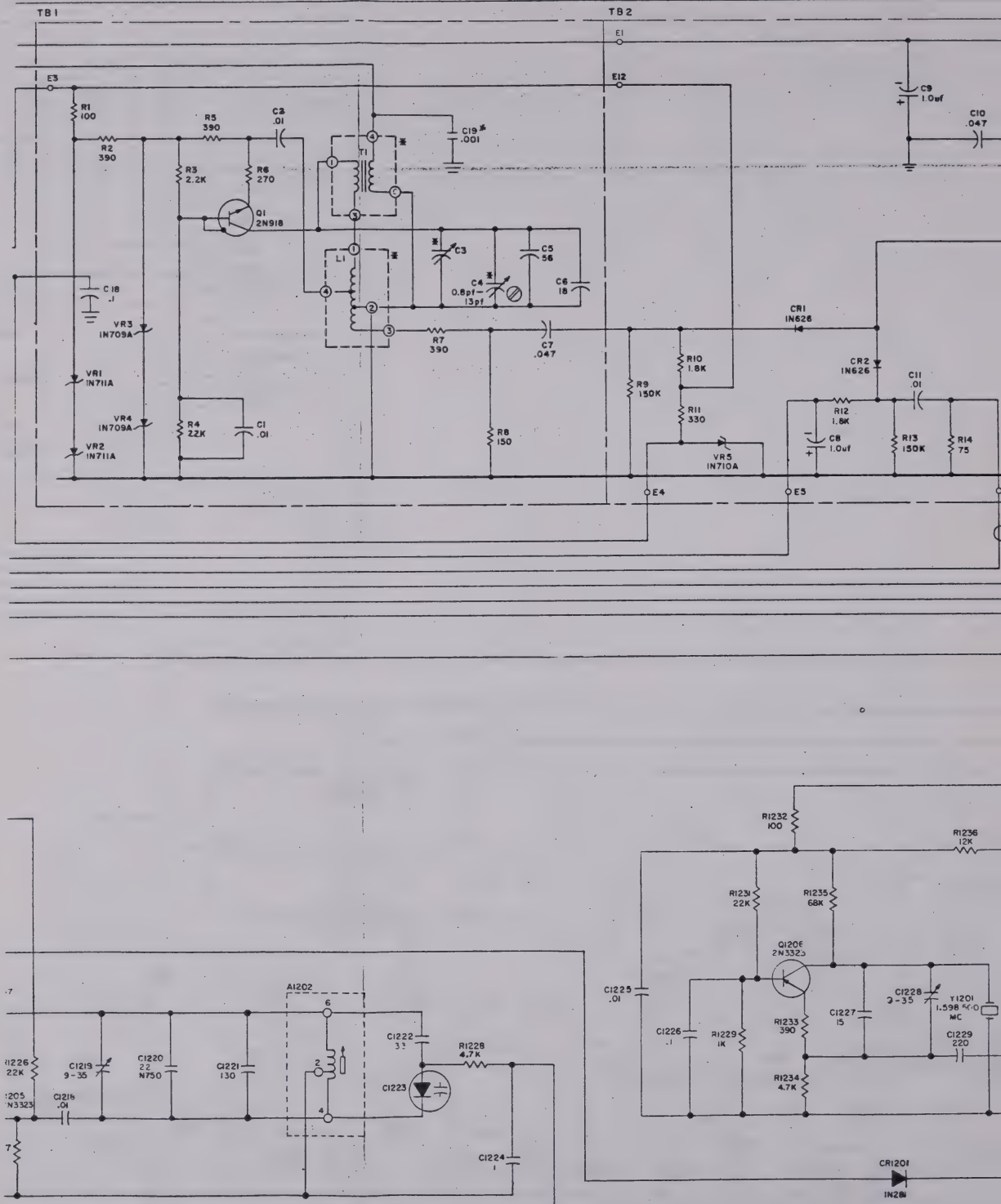


UNLESS OTHERWISE NOTED:

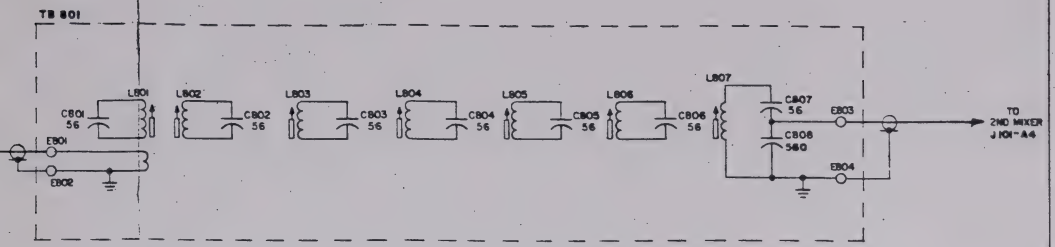
1. RESISTOR VALUES ARE IN OHMS 1/4 WATT K= 1,000 M= 1,000,000
2. CAPACITOR VALUES GREATER THAN ONE ARE IN PICO FARADS, LESS THAN ONE ARE IN MICROFARADS.
3. INDUCTANCE VALUES GREATER THAN ONE ARE IN MICROHENRIES, LESS THAN ONE ARE IN MILLIHENRIES.
4. PRESENCE OF ARROW INDICATES CLOCKWISE ROTATION

INDICATES SCREWDRIVER ADJUSTMENT

RACAL
DETECTOR BD RA 6217
DWG. NO. G-01304
SERIES 1200



-1.5 KC INSERTION OSC

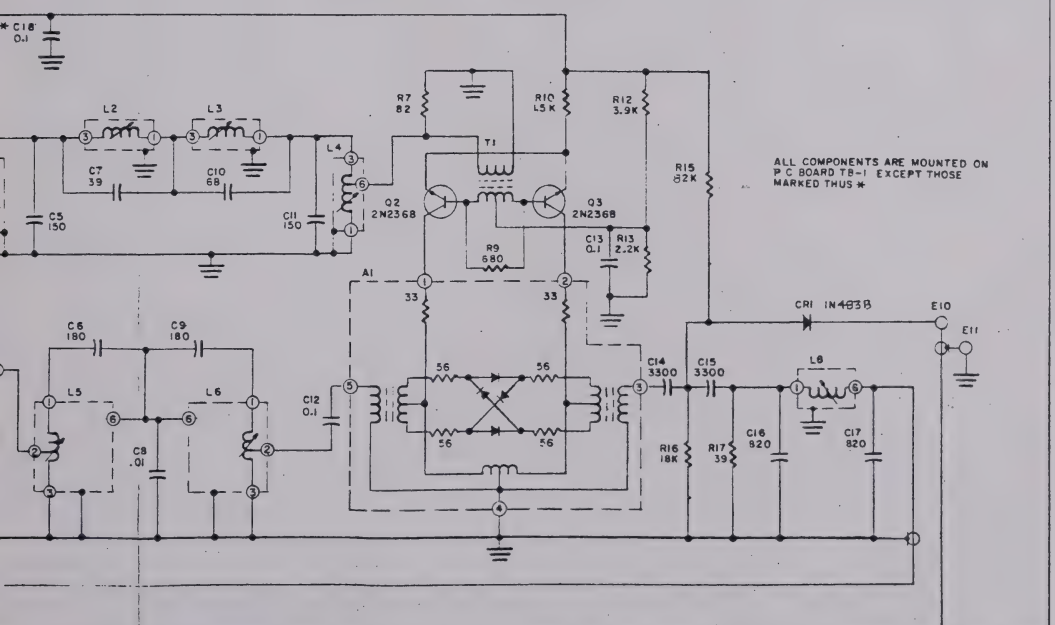


UNLESS OTHERWISE NOTED:

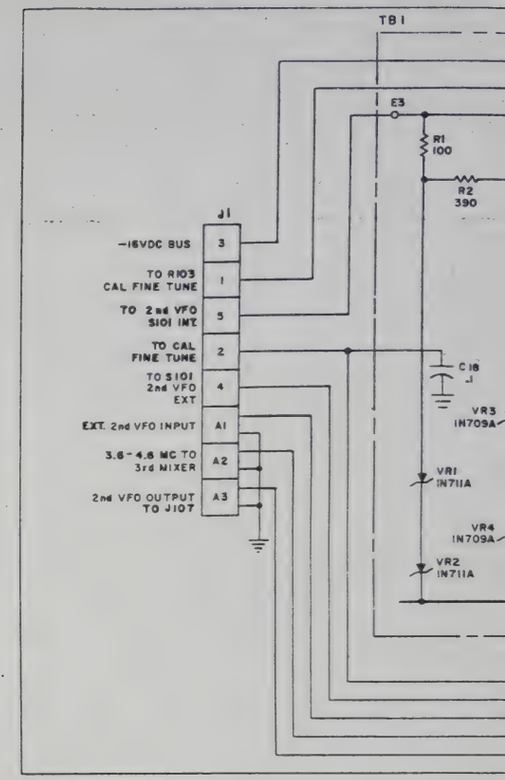
1. RESISTOR VALUES ARE IN OHMS WATT K = 1,000 M = 1,000,000
2. CAPACITOR VALUES GREATER THAN ONE ARE IN PICO FARADS, LESS THAN ONE ARE IN MICROFARADS.
3. INDUCTANCE VALUES GREATER THAN ONE ARE IN MICROHENRIES, LESS THAN ONE ARE IN MILLIHENRIES.
4. PRESENCE OF ARROW INDICATES CLOCKWISE ROTATION

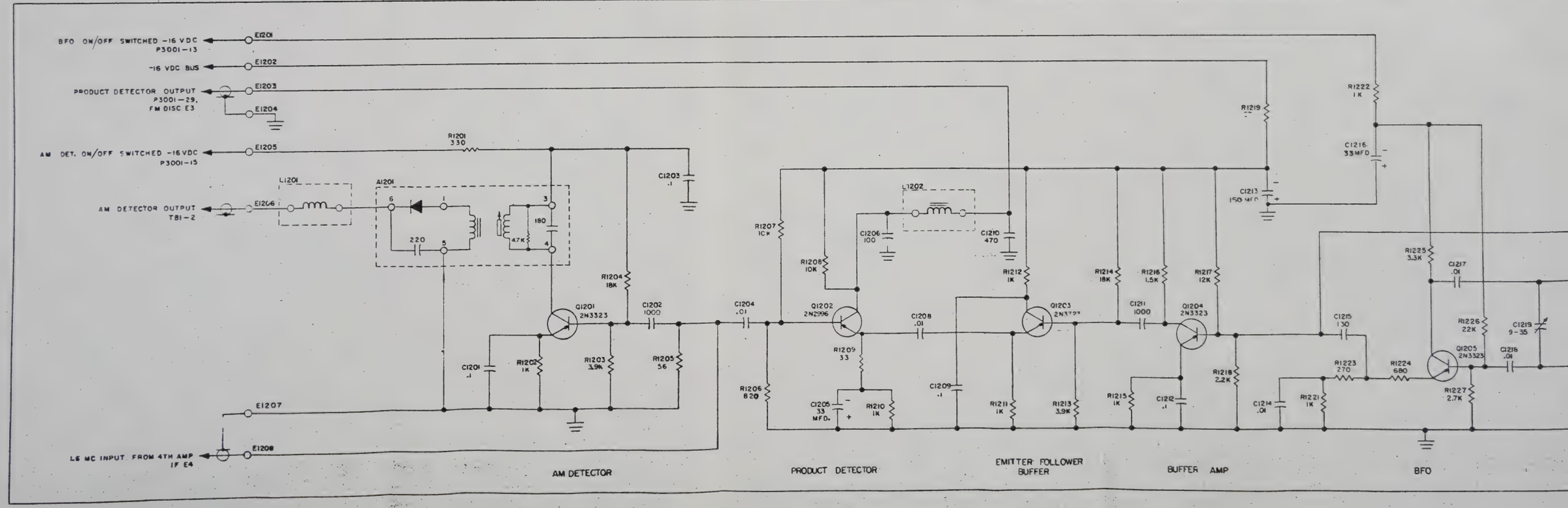
INDICATES SCREWDRIVER ADJUSTMENT

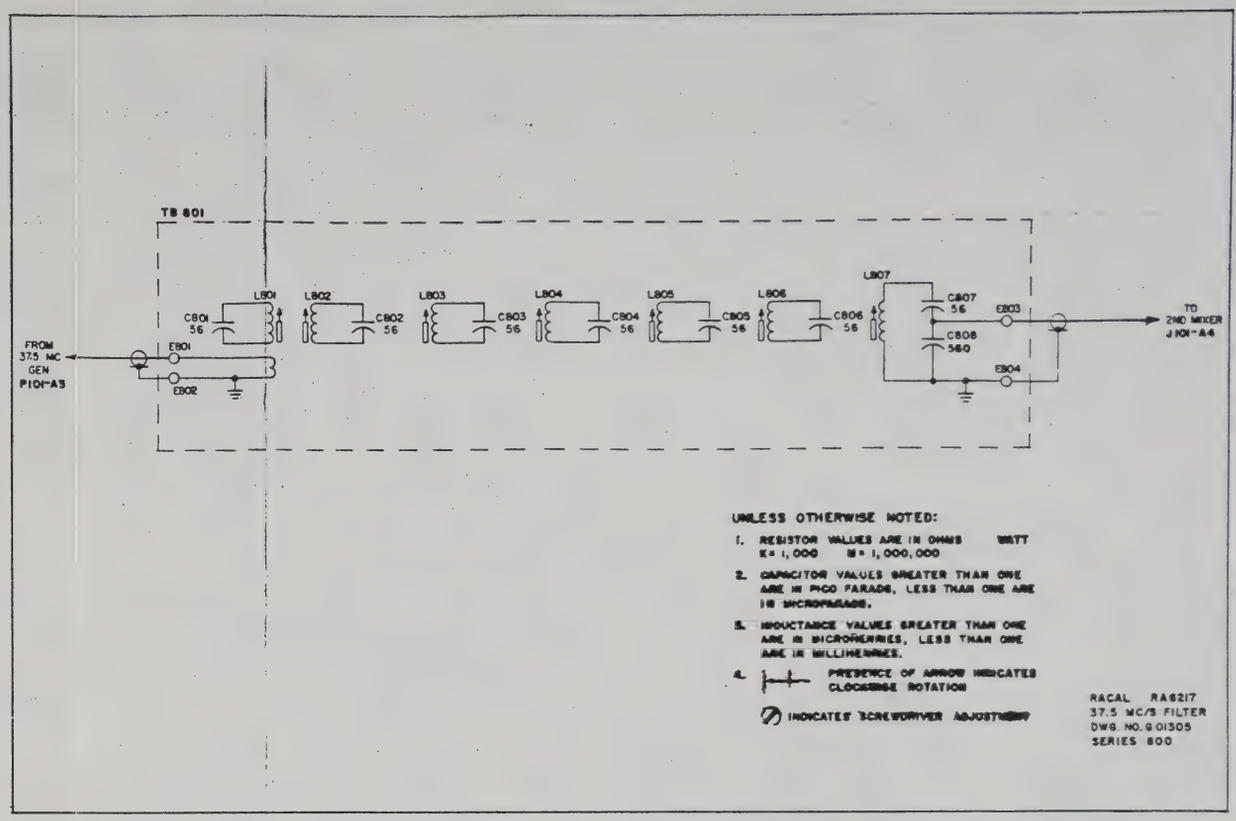
RACAL RA6217
37.5 MC/S FILTER
DWG. NO. G 01305
SERIES 800

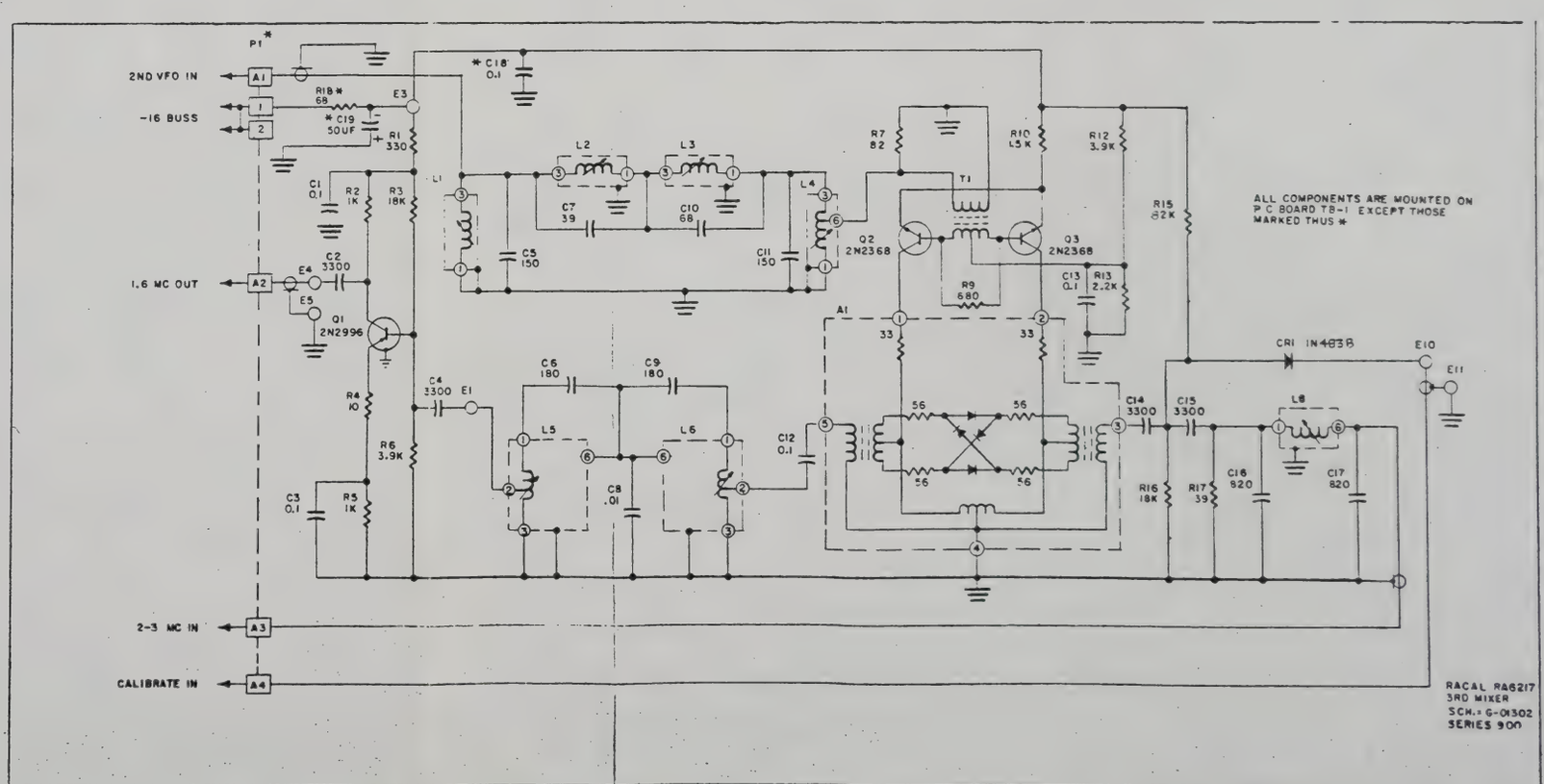


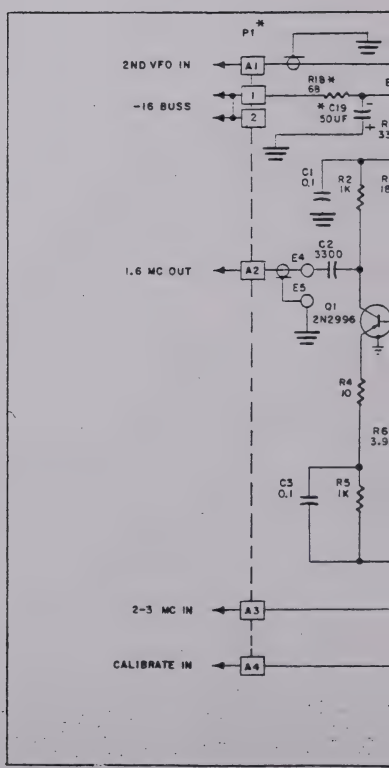
RACAL RA6217
3RD MIXER
SCH.# G-01302
SERIES 900


TB1
E3
R1
100
R2
390
J1
-16VDC BUS
3
TO R103
CAL FINE TUNE
1
TO 2nd VFO
S101 INT
5
TO CAL
FINE TUNE
2
TO S101
2nd VFO
EXT
4
EXT. 2nd VFO INPUT
A1
3.6-4.6 MC TO
3rd MIXER
A2
2nd VFO OUTPUT
TO J107
A3
C18
.1
VR3
1N709A
VR1
1N711A
VR4
1N709A
VR2
1N711A


BFO ON/OFF SWITCHED -16 VDC
P3001-13
E1201
-16 VDC BUS
E1202
PRODUCT DETECTOR OUTPUT
P3001-29,
FM DISC E3
E1203
E1204
AM DET. ON/OFF SWITCHED -16VDC
P3001-15
E1205
AM DETECTOR OUTPUT
T81-2
E1206
L1201
A1201
R1201
330
C1203
.1
R1204
18K
Q1201
2N3323
C1202
1000
C1201
.1
R1202
1K
R1203
3.9K
R1205
56
E1207
1.6 MC INPUT FROM 4TH AMP
IF E4
E1208
AM DETECTOR
L1202
R1207
10K
R1208
10K
C1206
100
C1210
470
Q1202
2N2996
C1204
.01
C1208
.01
R1209
33
R1206
820
C1205
33
MFD.
R1210
1K
C1209
.1
PRODUCT DETECTOR
R1212
1K
Q1203
2N3323
R1211
1K
R1213
3.9K
EMITTER FOLLOWER
BUFFER
R1219
R1222
1K
C1216
33MFD
C1213
150 MFD
R1214
18K
R1216
1.5K
R1217
12K
C1211
1000
Q1204
2N3323
R1215
1K
C1212
.1
R1218
2.2K
BUFFER AMP
R1225
3.3K
C1217
.01
C1215
130
R1223
270
R1224
680
R1226
22K
C1219
9-35
Q1205
2N3323
C1216
.01
C1214
.01
R1221
1K
R1227
2.7K
BFO


TB 801
L801
L802
L803
L804
L805
L806
L807
C801 56
C802 56
C803 56
C804 56
C805 56
C806 56
C807 56
C808 560
E801
E802
E803
E804
FROM 375 MC GEN P101-A3
TO 2ND MIXER J101-A4
UNLESS OTHERWISE NOTED:
1. RESISTOR VALUES ARE IN OHMS WATT K = 1,000 M = 1,000,000
2. CAPACITOR VALUES GREATER THAN ONE ARE IN PICO FARADS, LESS THAN ONE ARE IN MICROFARADS.
3. INDUCTANCE VALUES GREATER THAN ONE ARE IN MICROHENRIES, LESS THAN ONE ARE IN MILLIHENRIES.
4. PRESENCE OF ARROW INDICATES CLOCKWISE ROTATION
INDICATES SCREWDRIVER ADJUSTMENT
RACAL RA6217
37.5 MC/S FILTER
DWG. NO. G 01305
SERIES 800


P1 *
2ND VFO IN
-16 BUSS
1.6 MC OUT
2-3 MC IN
CALIBRATE IN
A1
A2
A3
A4
1
2
E1
E2
E3
E4
E5
E10
E11
* C18 0.1
R18 * 68
* C19 50UF
R1 330
C1 0.1
R2 1K
R3 18K
C2 3300
Q1 2N2996
R4 10
R6 3.9K
C3 0.1
R5 1K
C4 3300
L1
L2
L3
L4
L5
L6
C5 150
C6 180
C7 39
C8 .01
C9 180
C10 68
C11 150
C12 0.1
R7 82
R10 L5K
R12 3.9K
T1
Q2 2N2368
Q3 2N2368
R9 680
C13 0.1
R13 2.2K
R15 82K
33
33
CR1 IN4838
C14 3300
C15 3300
L8
R16 18K
R17 39
C16 820
C17 820
56
56
56
56
ALL COMPONENTS ARE MOUNTED ON P C BOARD TB-1 EXCEPT THOSE MARKED THUS *
RACAL RA6217
3RD MIXER
SCH. # G-01302
SERIES 900


P1 *
2ND VFO IN
A1
-16 BUSS
1
2
R18 *
68
* C19
50UF
C1
0.1
R2
1K
C2
3300
1.6 MC OUT
A2
E4
E5
Q1
2N2996
R4
10
C3
0.1
R5
1K
2-3 MC IN
A3
CALIBRATE IN
A4

UNLESS OTHERWISE NOTED:

1. RESISTOR VALUES ARE IN OHMS $\frac{1}{4}$ WATT
   K= 1,000 M= 1,000,000
2. CAPACITOR VALUES GREATER THAN ONE ARE IN PICO FARADS, LESS THAN ONE ARE IN MICROFARADS.
3. INDUCTANCE VALUES GREATER THAN ONE ARE IN MICROHENRIES, LESS THAN ONE ARE IN MILLIHENRIES.
4. ⟆ PRESENCE OF ARROW INDICATES CLOCKWISE ROTATION

   ⊘ INDICATES SCREWDRIVER ADJUSTMENT

RACAL RA6217
1 MC MODULE & CALIBRATOR
DWG NO. 6-03412 B
SERIES 600

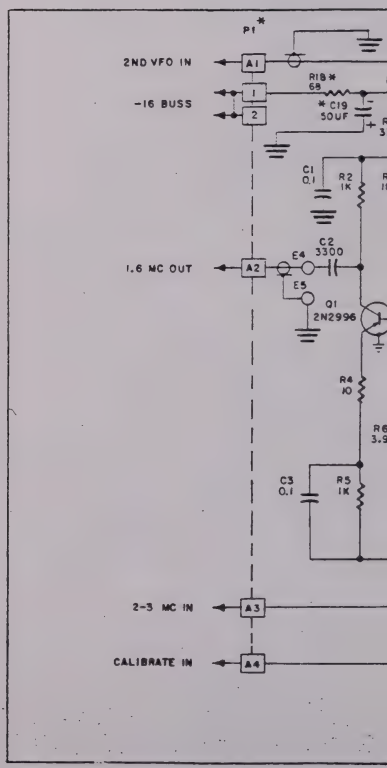
UNLESS OTHERWISE NOTED:

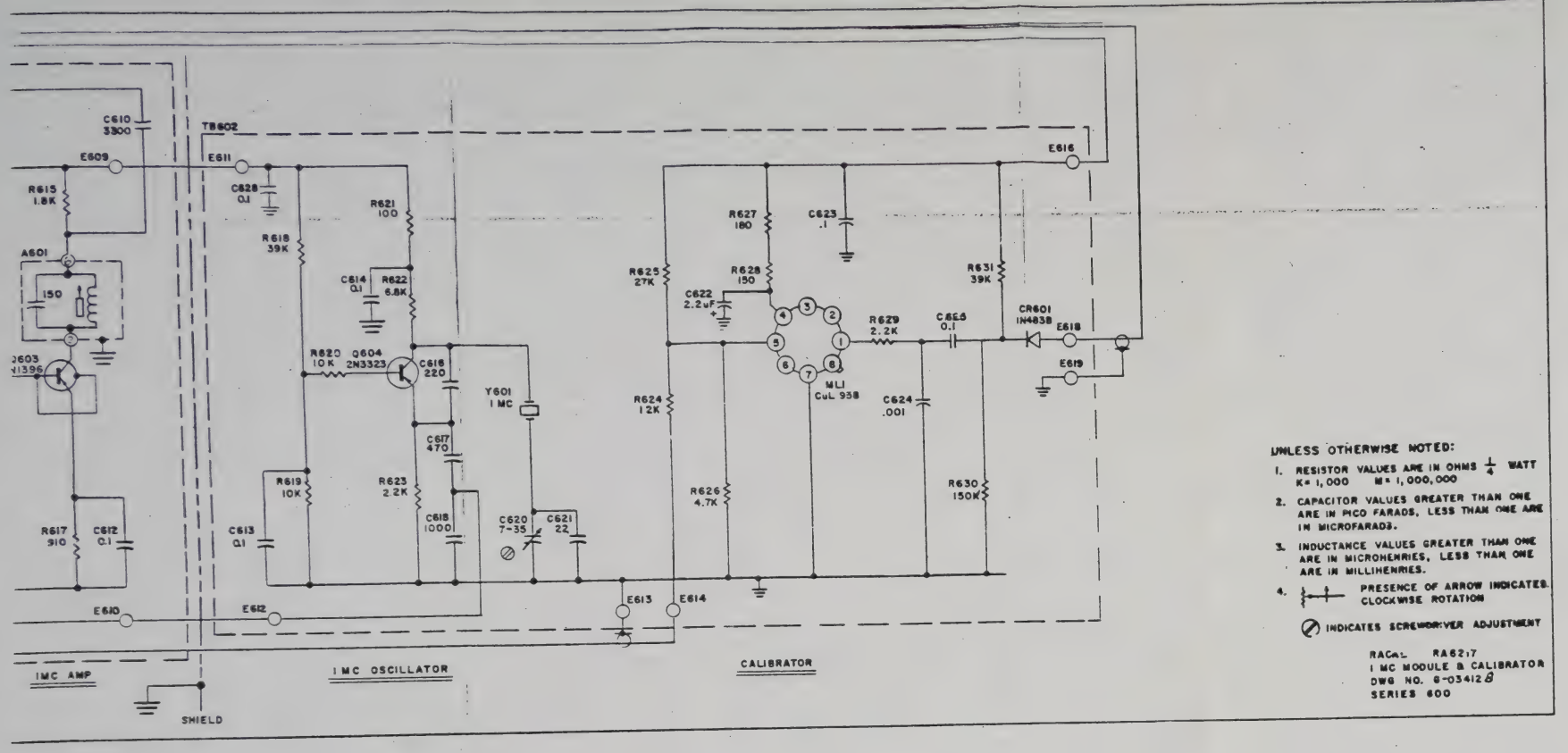
1. RESISTOR VALUES ARE IN OHMS $\frac{1}{4}$ WATT
   K= 1,000 M= 1,000,000
2. CAPACITOR VALUES GREATER THAN ONE ARE IN PICO FARADS, LESS THAN ONE ARE IN MICROFARADS.
3. INDUCTANCE VALUES GREATER THAN ONE ARE IN MICROHENRIES, LESS THAN ONE ARE IN MILLIHENRIES.
4. ⟆ PRESENCE OF ARROW INDICATES CLOCKWISE ROTATION

   ⊘ INDICATES SCREWDRIVER ADJUSTMENT

5. ALL COMPONENTS INSIDE BROKEN LINES ARE MOUNTED ON P.C. BOARD.

RACAL RA 6217
37.5 MC/S GENERATOR
DWG. NO. 601303
SERIES 700


P1*
2ND VFO IN
A1
-16 BUSS
1
2
R1B*
68
*C19
50UF
C1
0.1
R2
1K
C2
3300
1.6 MC OUT
A2
E4
E5
Q1
2N2996
R4
10
C3
0.1
R5
1K
2-3 MC IN
A3
CALIBRATE IN
A4

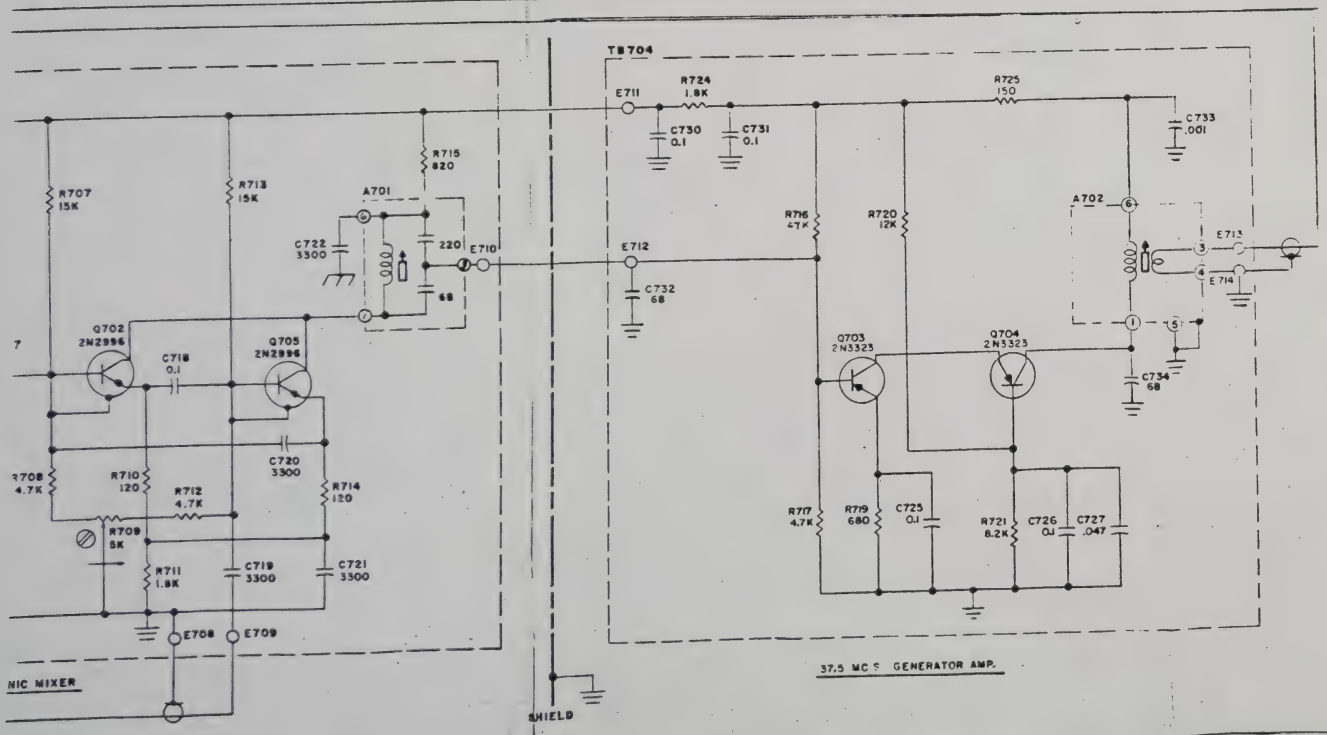


UNLESS OTHERWISE NOTED:

1. RESISTOR VALUES ARE IN OHMS $\frac{1}{4}$ WATT
   K = 1,000 M = 1,000,000
2. CAPACITOR VALUES GREATER THAN ONE ARE IN PICO FARADS, LESS THAN ONE ARE IN MICROFARADS.
3. INDUCTANCE VALUES GREATER THAN ONE ARE IN MICROHENRIES, LESS THAN ONE ARE IN MILLIHENRIES.
4. PRESENCE OF ARROW INDICATES CLOCKWISE ROTATION

INDICATES SCREWDRIVER ADJUSTMENT

RACAL RA6217
1 MC MODULE & CALIBRATOR
DWG NO. G-03412 B
SERIES 600



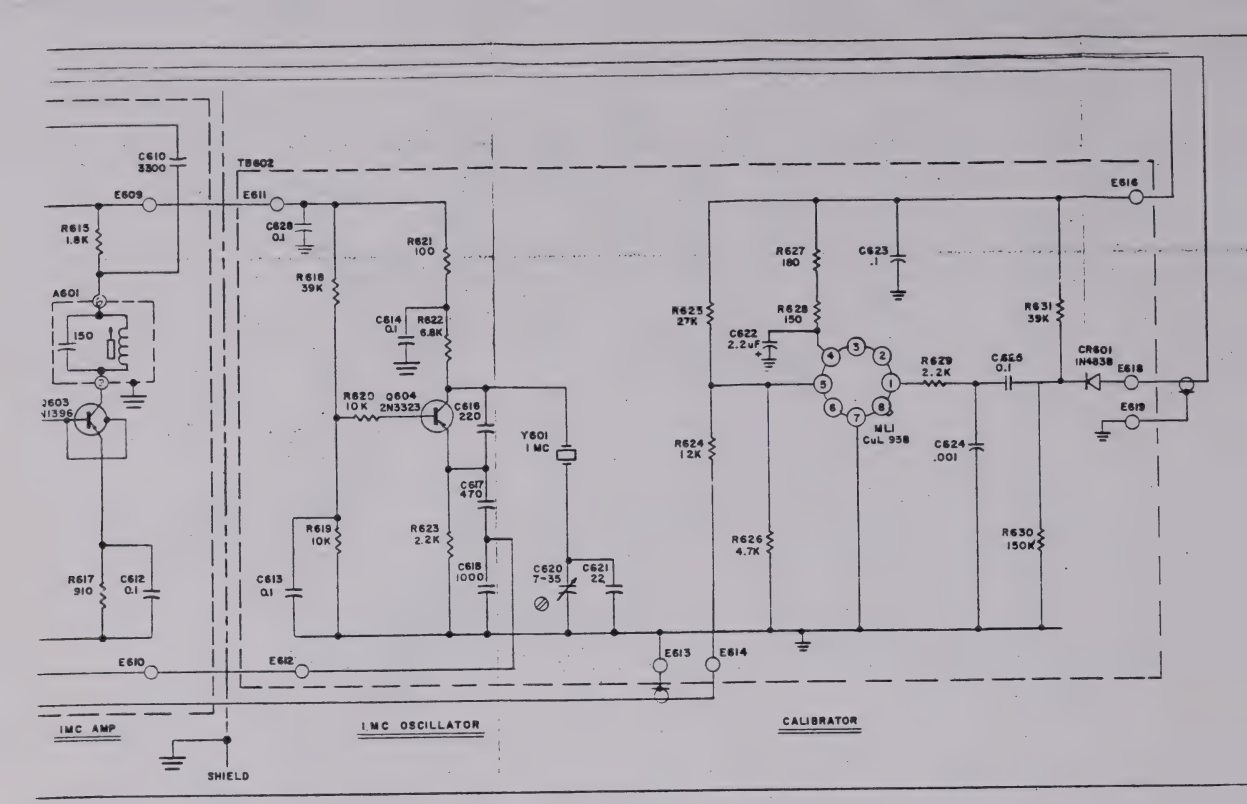
UNLESS OTHERWISE NOTED:

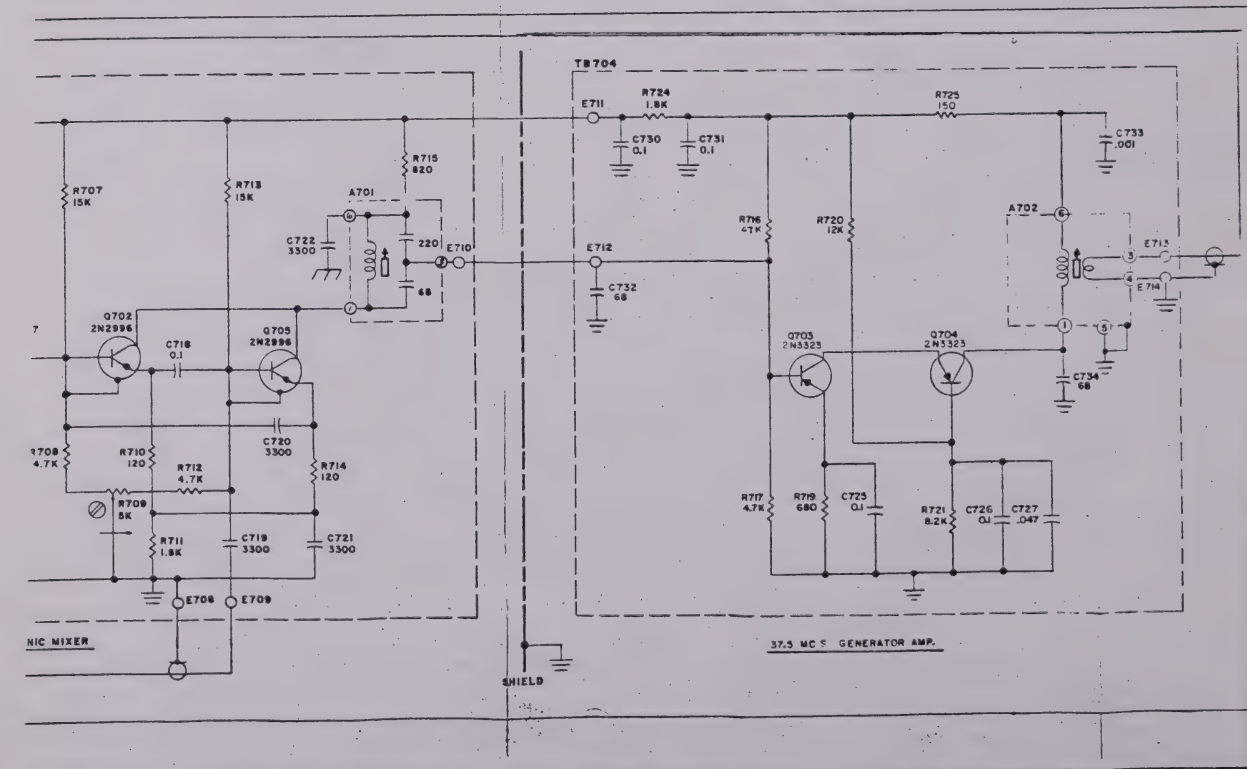
1. RESISTOR VALUES ARE IN OHMS $\frac{1}{4}$ WATT
   K = 1,000 M = 1,000,000
2. CAPACITOR VALUES GREATER THAN ONE ARE IN PICO FARADS, LESS THAN ONE ARE IN MICROFARADS.
3. INDUCTANCE VALUES GREATER THAN ONE ARE IN MICROHENRIES, LESS THAN ONE ARE IN MILLIHENRIES.
4. PRESENCE OF ARROW INDICATES CLOCKWISE ROTATION

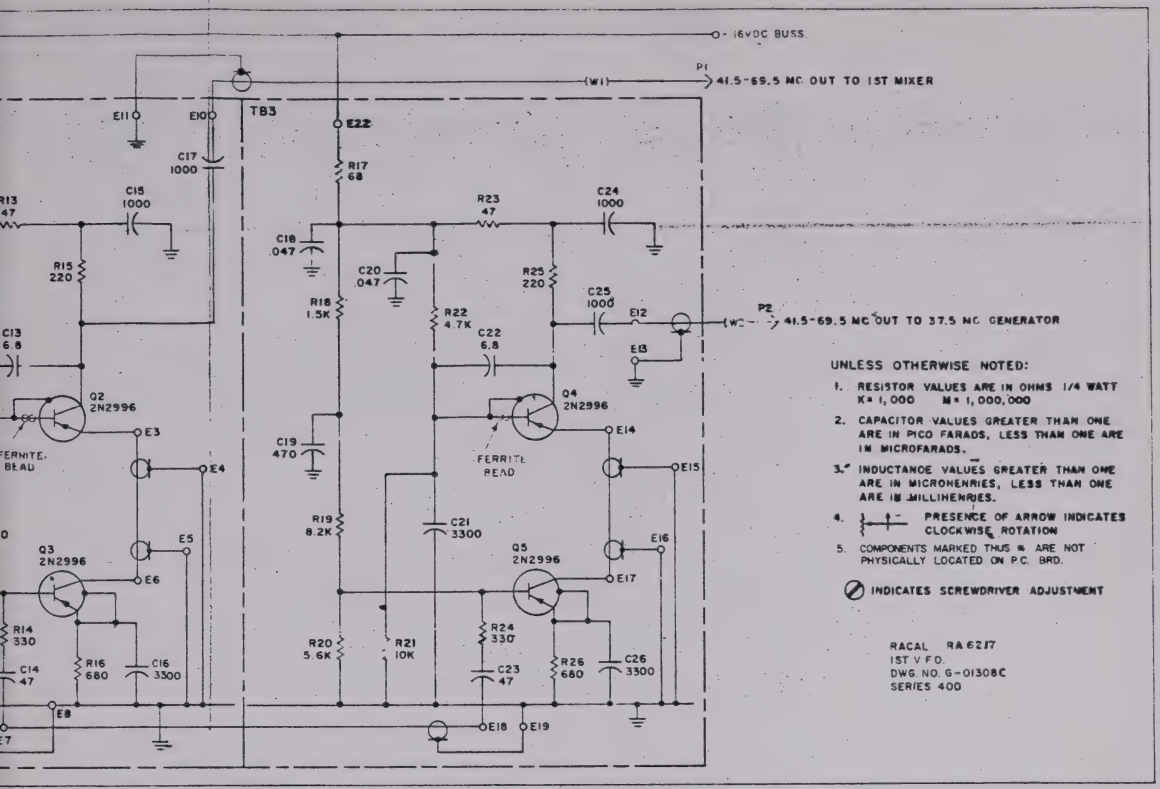
INDICATES SCREWDRIVER ADJUSTMENT

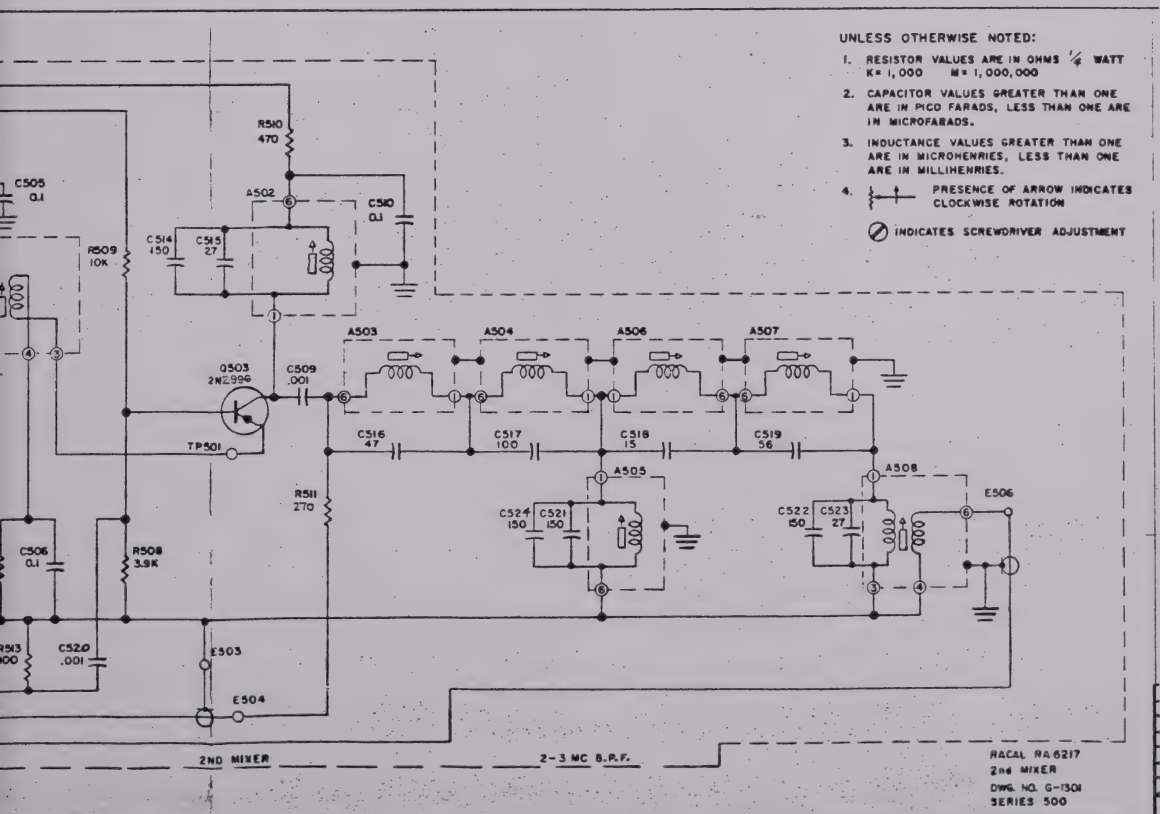
5. ALL COMPONENTS INSIDE BROKEN LINES ARE MOUNTED ON P.C. BOARD.

RACAL RA 6217
37.5 MC/S GENERATOR
DWG. NO. G01303
SERIES 700


TB602
E609
E611
E616
C610 3300
R615 1.8K
A601
150
C828 0.1
R621 100
R618 39K
C614 0.1
R622 6.8K
R620 10K
Q604 2N3323
C616 220
Y601 1 MC
C617 470
R619 10K
R623 2.2K
C618 1000
C613 0.1
C620 7-35
C621 22
R617 910
C612 0.1
E610
E612
E613
E614
R627 180
C623 .1
R625 27K
R628 150
C622 2.2uF
R631 39K
CR601 1N4838
E618
E619
R629 2.2K
C625 0.1
MLI CuL 958
R624 12K
C624 .001
R626 4.7K
R630 150K
IMC AMP
1 MC OSCILLATOR
CALIBRATOR
SHIELD


TB704
E711
R724 1.8K
C730 0.1
C731 0.1
R725 150
C733 .001
R715 820
R707 15K
R713 15K
A701
C722 3300
220
E710
68
E712
C732 68
R716 47K
R720 12K
A702
E713
E714
Q702 2N2996
Q705 2N2996
C718 0.1
Q703 2N3323
Q704 2N3323
C734 68
C720 3300
R708 4.7K
R710 120
R712 4.7K
R714 120
R709 5K
R711 1.8K
C719 3300
C721 3300
R717 4.7K
R719 680
C725 0.1
R721 8.2K
C726 .01
C727 .047
E708
E709
NIC MIXER
37.5 MC S GENERATOR AMP.
SHIELD


+16VDC BUSS
P1
(W1)
41.5-69.5 MC OUT TO 1ST MIXER
TB3
E11
E10
E22
C17 1000
R17 68
R13 47
C15 1000
R23 47
C24 1000
C18 .047
C20 .047
R15 220
R25 220
C25 1000
E12
P2
(W2)
41.5-69.5 MC OUT TO 37.5 MC GENERATOR
R18 1.5K
R22 4.7K
C22 6.8
C13 6.8
E13
Q2 2N2996
Q4 2N2996
FERRITE BEAD
E3
E14
C19 470
E4
E15
R19 8.2K
C21 3300
E5
E16
Q3 2N2996
Q5 2N2996
E6
E17
R14 330
R16 680
C16 3300
R20 5.6K
R21 10K
R24 330
C23 47
R26 680
C26 3300
C14 47
E8
E18
E19
UNLESS OTHERWISE NOTED:
1. RESISTOR VALUES ARE IN OHMS 1/4 WATT K= 1,000 M= 1,000,000
2. CAPACITOR VALUES GREATER THAN ONE ARE IN PICO FARADS, LESS THAN ONE ARE IN MICROFARADS.
3. INDUCTANCE VALUES GREATER THAN ONE ARE IN MICROHENRIES, LESS THAN ONE ARE IN MILLIHENRIES.
4. PRESENCE OF ARROW INDICATES CLOCKWISE ROTATION
5. COMPONENTS MARKED THUS * ARE NOT PHYSICALLY LOCATED ON P.C. BRD.
INDICATES SCREWDRIVER ADJUSTMENT
RACAL RA 6217
1ST V.F.O.
DWG. NO. G-0130BC
SERIES 400


UNLESS OTHERWISE NOTED:
1. RESISTOR VALUES ARE IN OHMS 1/4 WATT K= 1,000 M= 1,000,000
2. CAPACITOR VALUES GREATER THAN ONE ARE IN PICO FARADS, LESS THAN ONE ARE IN MICROFARADS.
3. INDUCTANCE VALUES GREATER THAN ONE ARE IN MICROHENRIES, LESS THAN ONE ARE IN MILLIHENRIES.
4. PRESENCE OF ARROW INDICATES CLOCKWISE ROTATION
INDICATES SCREWDRIVER ADJUSTMENT
R510 470
A502
C510 0.1
C505 0.1
C514 150
C515 27
R509 10K
A503
A504
A506
A507
Q503 2N2996
C509 .001
TP501
C516 47
C517 100
C518 15
C519 56
A505
A508
E506
C524 150
C521 150
C522 150
C523 27
R511 270
C506 0.1
R508 3.9K
C520 .001
E503
E504
2ND MIXER
2-3 MC B.P.F.
RACAL RA 6217
2nd MIXER
DWG. NO. G-1301
SERIES 500

SHIELD

HARMONIC MIXER

HARMONIC LOW PASS FILTER

HARMONIC GENERATION

1 MC OSCILLATOR

1 MC AMP

1 MC AMP

1 MC BUFFER

TB704

TB703

TB702

TB701

TB602

TB601

FROM 1 MC AMP E601

TO 37.5 MC FILTER E801

FROM SYSTEM SWITCH -16 VDC

FROM 1 ST VFO E412

P/O J601

P/O J801

100 KC OUT TO 3 RD MIXER

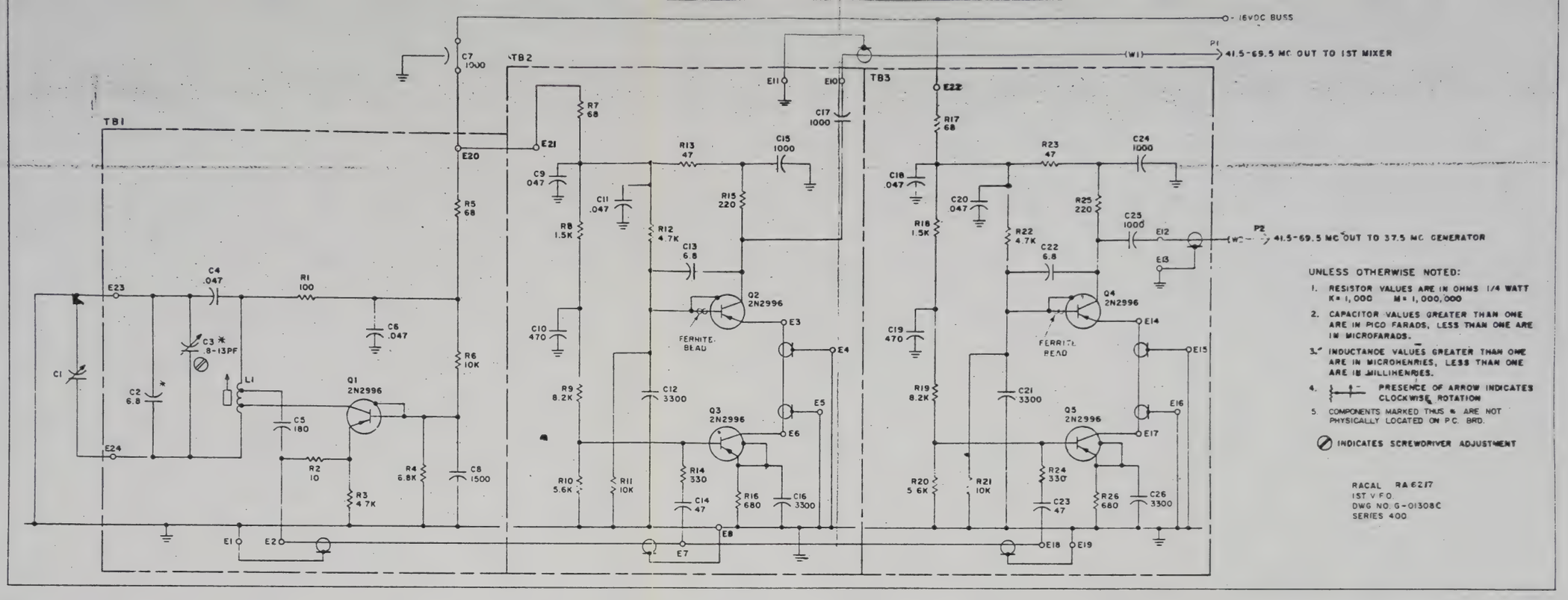
CALIBRATOR ON -16 VDC

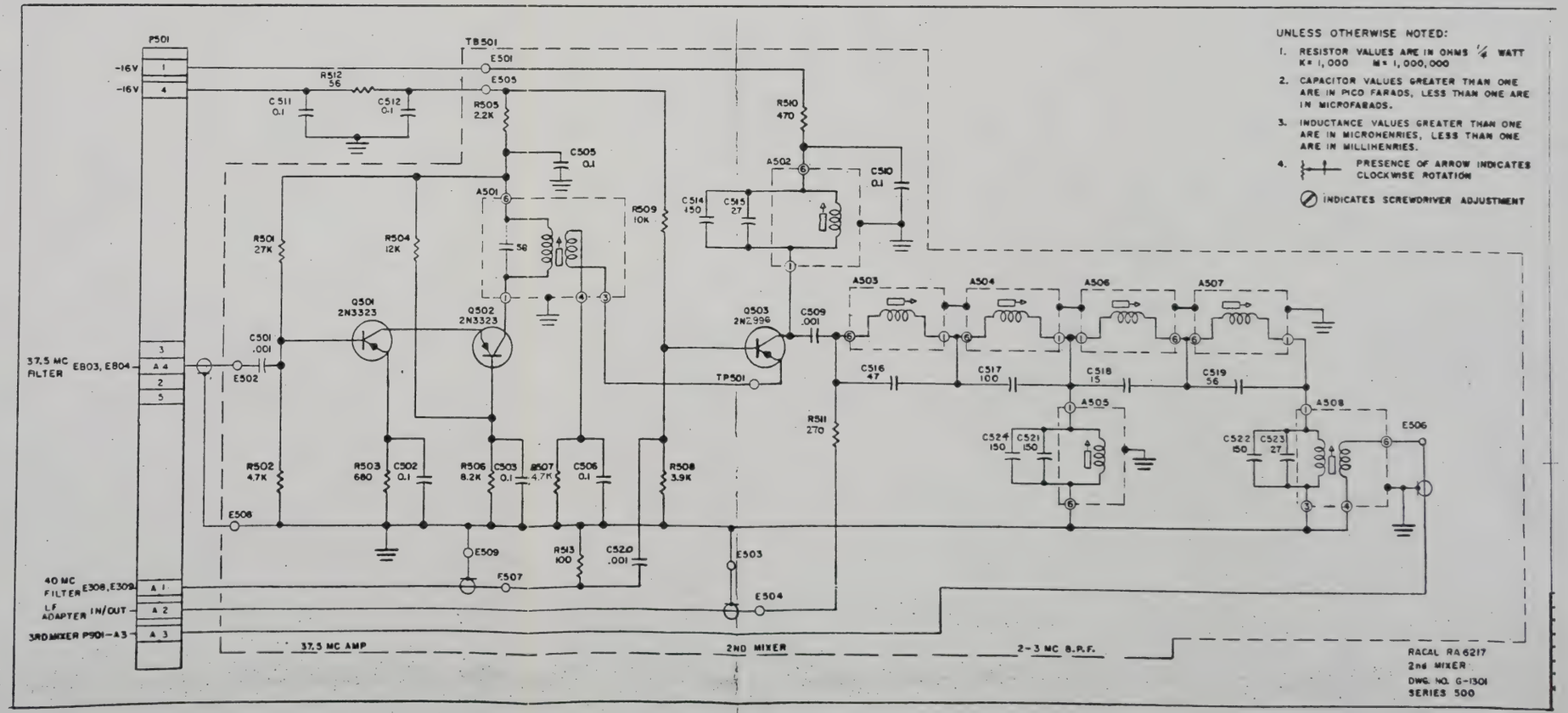
1 MC OUT

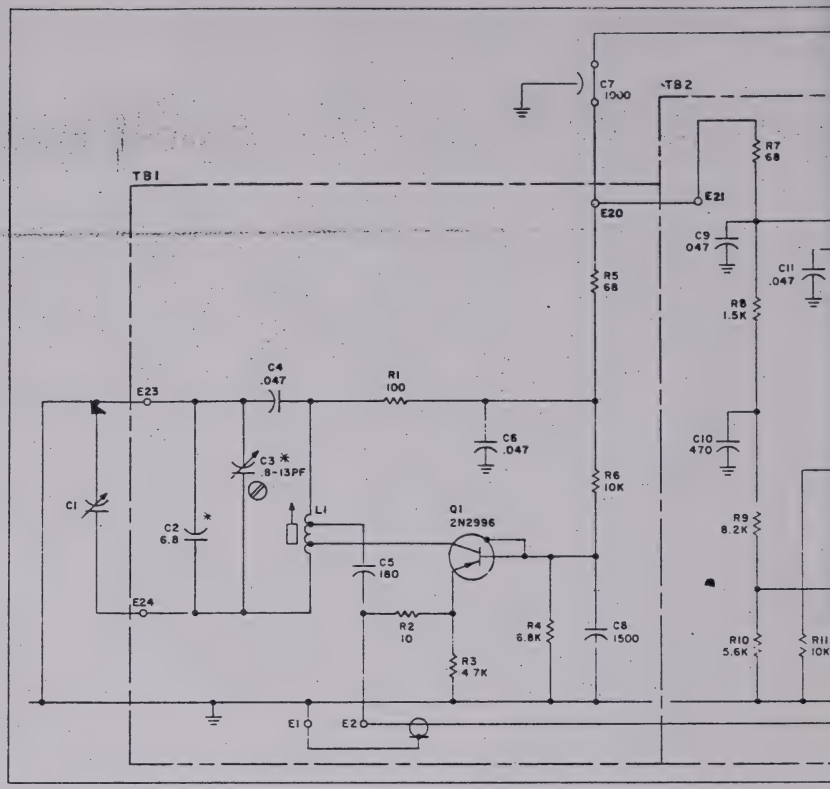
-16 BUSS

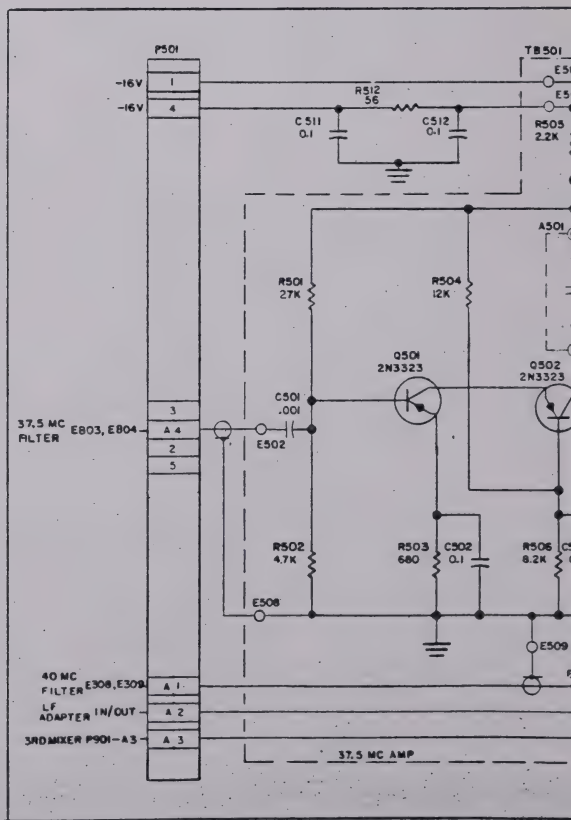
1 MC IN

1 MC TO HARM GEN E701


-16VDC BUSS
TB1
TB2
TB3
P1
41.5-69.5 MC OUT TO 1ST MIXER
P2
41.5-69.5 MC OUT TO 37.5 MC GENERATOR
E20
E21
E22
E23
E24
E1
E2
E3
E4
E5
E6
E7
E8
E10
E11
E12
E13
E14
E15
E16
E17
E18
E19
C1
C2 *
C3 * .8-13PF
C4 .047
C5 180
C6 .047
C7 1000
C8 1500
C9 .047
C10 470
C11 .047
C12 3300
C13 6.8
C14 47
C15 1000
C16 3300
C17 1000
C18 .047
C19 470
C20 .047
C21 3300
C22 6.8
C23 47
C24 1000
C25 1000
C26 3300
R1 100
R2 10
R3 4.7K
R4 6.8K
R5 68
R6 10K
R7 68
R8 1.5K
R9 8.2K
R10 5.6K
R11 10K
R12 4.7K
R13 47
R14 330
R15 220
R16 680
R17 68
R18 1.5K
R19 8.2K
R20 5.6K
R21 10K
R22 4.7K
R23 47
R24 330
R25 220
R26 680
L1
Q1 2N2996
Q2 2N2996
Q3 2N2996
Q4 2N2996
Q5 2N2996
FERRITE BEAD
FERRITE BEAD
UNLESS OTHERWISE NOTED:
1. RESISTOR VALUES ARE IN OHMS 1/4 WATT K= 1,000 M= 1,000,000
2. CAPACITOR VALUES GREATER THAN ONE ARE IN PICO FARADS, LESS THAN ONE ARE IN MICROFARADS.
3. INDUCTANCE VALUES GREATER THAN ONE ARE IN MICROHENRIES, LESS THAN ONE ARE IN MILLIHENRIES.
4. PRESENCE OF ARROW INDICATES CLOCKWISE ROTATION
5. COMPONENTS MARKED THUS * ARE NOT PHYSICALLY LOCATED ON P.C. BRD.
INDICATES SCREWDRIVER ADJUSTMENT
RACAL RA 6217
1ST V.F.O.
DWG NO. G-01308C
SERIES 400


P501
-16V
-16V
37.5 MC FILTER E803, E804
40 MC FILTER E308, E309
I.F. ADAPTER IN/OUT
3RD MIXER P901-A3
TB501
E501
E502
E503
E504
E505
E506
E507
E508
E509
TP501
R501 27K
R502 4.7K
R503 680
R504 12K
R505 2.2K
R506 8.2K
R507 4.7K
R508 3.9K
R509 10K
R510 470
R511 270
R512 56
R513 100
C501 .001
C502 0.1
C503 0.1
C505 0.1
C506 0.1
C509 .001
C510 0.1
C511 0.1
C512 0.1
C516 47
C517 100
C518 15
C519 56
C520 .001
C521 150
C522 150
C523 27
C524 150
A501
A502
A503
A504
A505
A506
A507
A508
Q501 2N3323
Q502 2N3323
Q503 2N2996
37.5 MC AMP
2ND MIXER
2-3 MC B.P.F.
UNLESS OTHERWISE NOTED:
1. RESISTOR VALUES ARE IN OHMS 1/4 WATT K= 1,000 M= 1,000,000
2. CAPACITOR VALUES GREATER THAN ONE ARE IN PICO FARADS, LESS THAN ONE ARE IN MICROFARADS.
3. INDUCTANCE VALUES GREATER THAN ONE ARE IN MICROHENRIES, LESS THAN ONE ARE IN MILLIHENRIES.
4. PRESENCE OF ARROW INDICATES CLOCKWISE ROTATION
INDICATES SCREWDRIVER ADJUSTMENT
RACAL RA 6217
2nd MIXER
DWG. NO. G-1301
SERIES 500


TB1
TB2
C7 1000
E20
E21
R7 68
C9 .047
C11 .047
R5 68
R8 1.5K
C4 .047
R1 100
E23
C6 .047
C3 * 8-13PF
R6 10K
C10 470
C1
C2 6.8 *
L1
Q1 2N2996
R9 8.2K
C5 180
E24
R2 10
R4 6.8K
C8 1500
R3 4.7K
R10 5.6K
R11 10K
E1
E2


P501
TB501
-16V
-16V
R512 56
C511 0.1
C512 0.1
R505 2.2K
A501
R501 27K
R504 12K
Q501 2N3323
Q502 2N3323
C501 .001
37.5 MC FILTER E803, E804
E502
R502 4.7K
R503 680
C502 0.1
R506 8.2K
E508
E509
40 MC FILTER E308, E309
LF ADAPTER IN/OUT
3RD MIXER P901-A3
37.5 MC AMP

SWITCH

OUTPUT

AGC BUS

UNLESS OTHERWISE NOTED:

1. RESISTOR VALUES ARE IN OHMS ¼ WATT
   K= 1,000 M= 1,000,000
2. CAPACITOR VALUES GREATER THAN ONE ARE IN PICO FARADS, LESS THAN ONE ARE IN MICROFARADS.
3. INDUCTANCE VALUES GREATER THAN ONE ARE IN MICROHENRIES, LESS THAN ONE ARE IN MILLIHENRIES.
4. PRESENCE OF ARROW INDICATES CLOCKWISE ROTATION
5. ⊘ INDICATES SCREWDRIVER ADJUSTMENT
6. ◯ INDICATES FRONT PANEL CONTROL

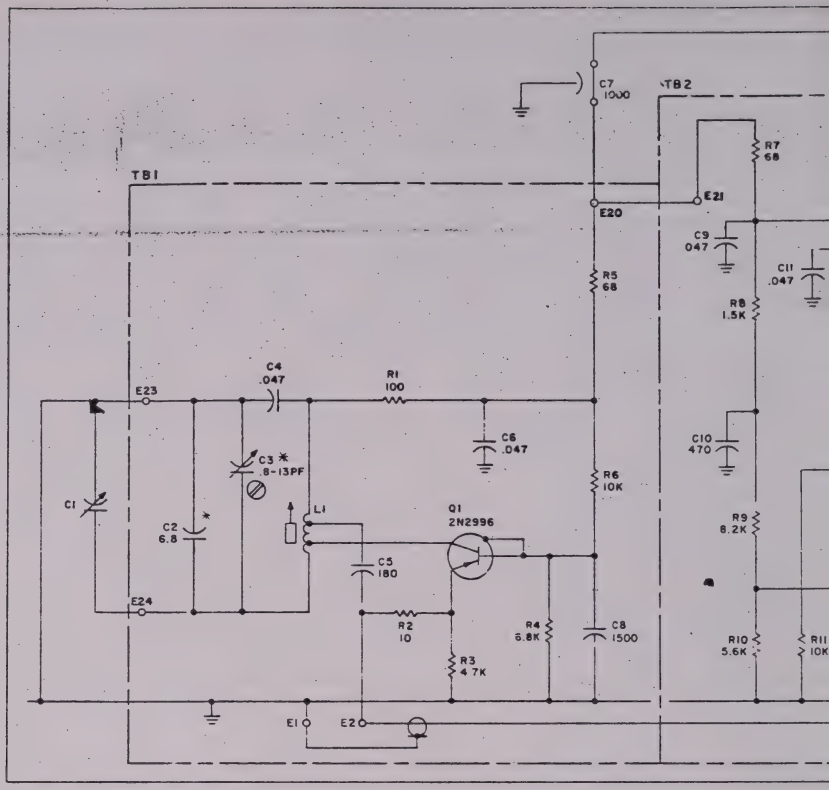
RACAL RA6217
RF UNIT
DWG. NO. G 02022F
SERIES 200

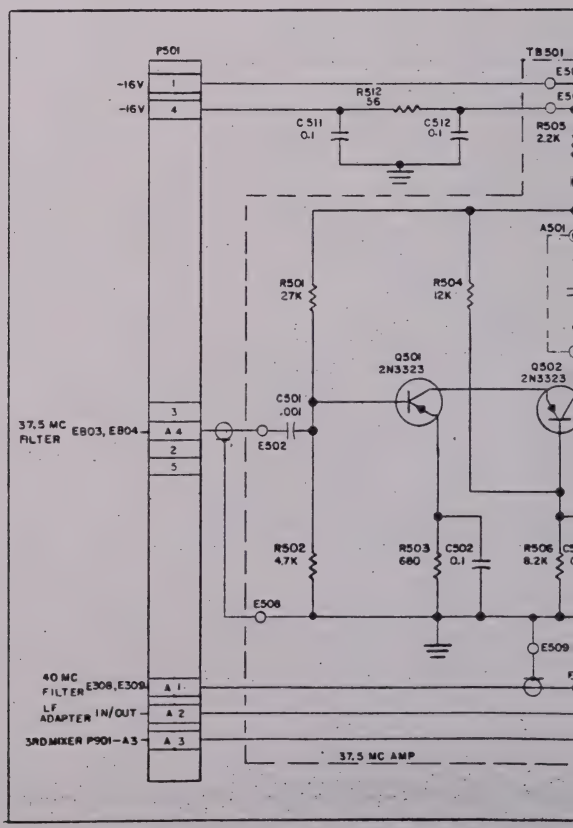
UNLESS OTHERWISE NOTED:

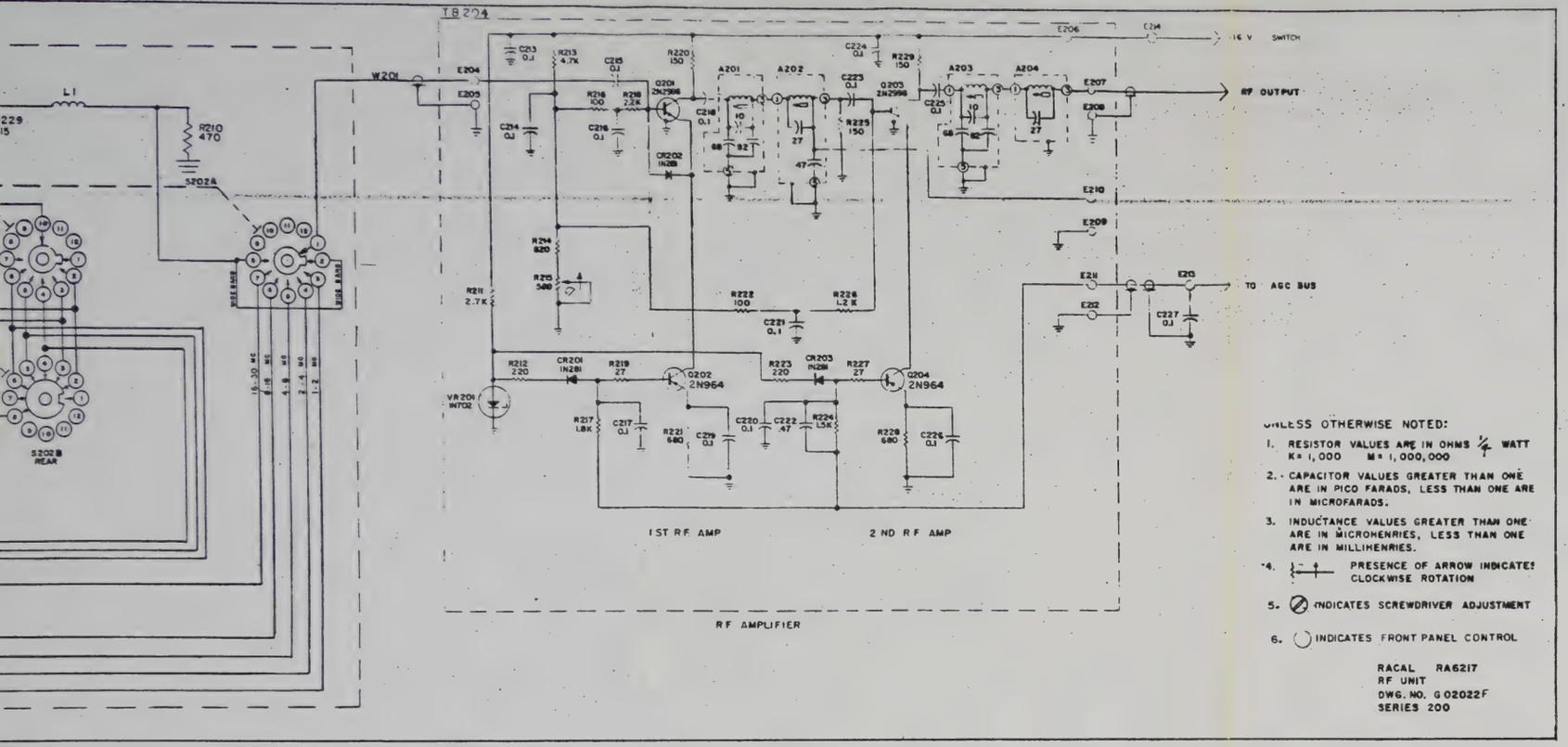
1. RESISTOR VALUES ARE IN OHMS ¼ WATT
   K= 1,000 M= 1,000,000
2. CAPACITOR VALUES GREATER THAN ONE ARE IN PICO FARADS, LESS THAN ONE ARE IN MICROFARADS.
3. INDUCTANCE VALUES GREATER THAN ONE ARE IN MICROHENRIES, LESS THAN ONE ARE IN MILLIHENRIES.
4. PRESENCE OF ARROW INDICATES CLOCKWISE ROTATION

⊘ INDICATES SCREWDRIVER ADJUSTMENT.

RACAL RA 6217
1 ST. MIXER & 40 MC FILTER
DWG. NO. G 01304
SERIES 300


TB1
TB2
C7 1000
E20
E21
R7 68
C9 .047
C11 .047
R5 68
R8 1.5K
C4 .047
R1 100
E23
C6 .047
C3 * 8-13PF
C1
C2 6.8
L1
Q1 2N2996
R6 10K
C10 470
R9 8.2K
C5 180
E24
R2 10
R4 6.8K
C8 1500
R10 5.6K
R11 10K
R3 4.7K
E1
E2

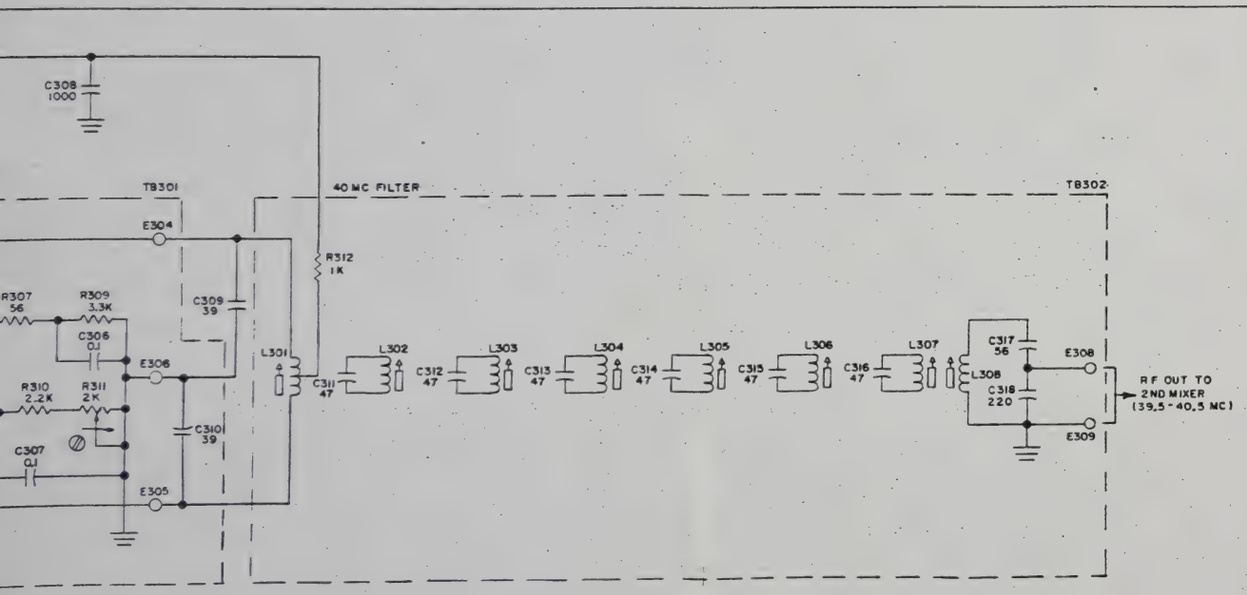

P501
TB501
-16V
-16V
R512 56
C511 0.1
C512 0.1
R503 2.2K
A501
R501 27K
R504 12K
Q501 2N3323
Q502 2N3323
C501 .001
37.5 MC FILTER E803, E804
E502
R502 4.7K
R503 680
C502 0.1
R506 8.2K
E508
E509
40 MC FILTER E308, E309
LF ADAPTER IN/OUT
3RD MIXER P901-A3
37.5 MC AMP



UNLESS OTHERWISE NOTED:

1. RESISTOR VALUES ARE IN OHMS $\frac{1}{4}$ WATT
   K = 1,000 M = 1,000,000
2. CAPACITOR VALUES GREATER THAN ONE ARE IN PICO FARADS, LESS THAN ONE ARE IN MICROFARADS.
3. INDUCTANCE VALUES GREATER THAN ONE ARE IN MICROHENRIES, LESS THAN ONE ARE IN MILLIHENRIES.
4. PRESENCE OF ARROW INDICATES CLOCKWISE ROTATION
5. INDICATES SCREWDRIVER ADJUSTMENT
6. INDICATES FRONT PANEL CONTROL

RACAL RA6217
RF UNIT
DWG. NO. G 02022F
SERIES 200

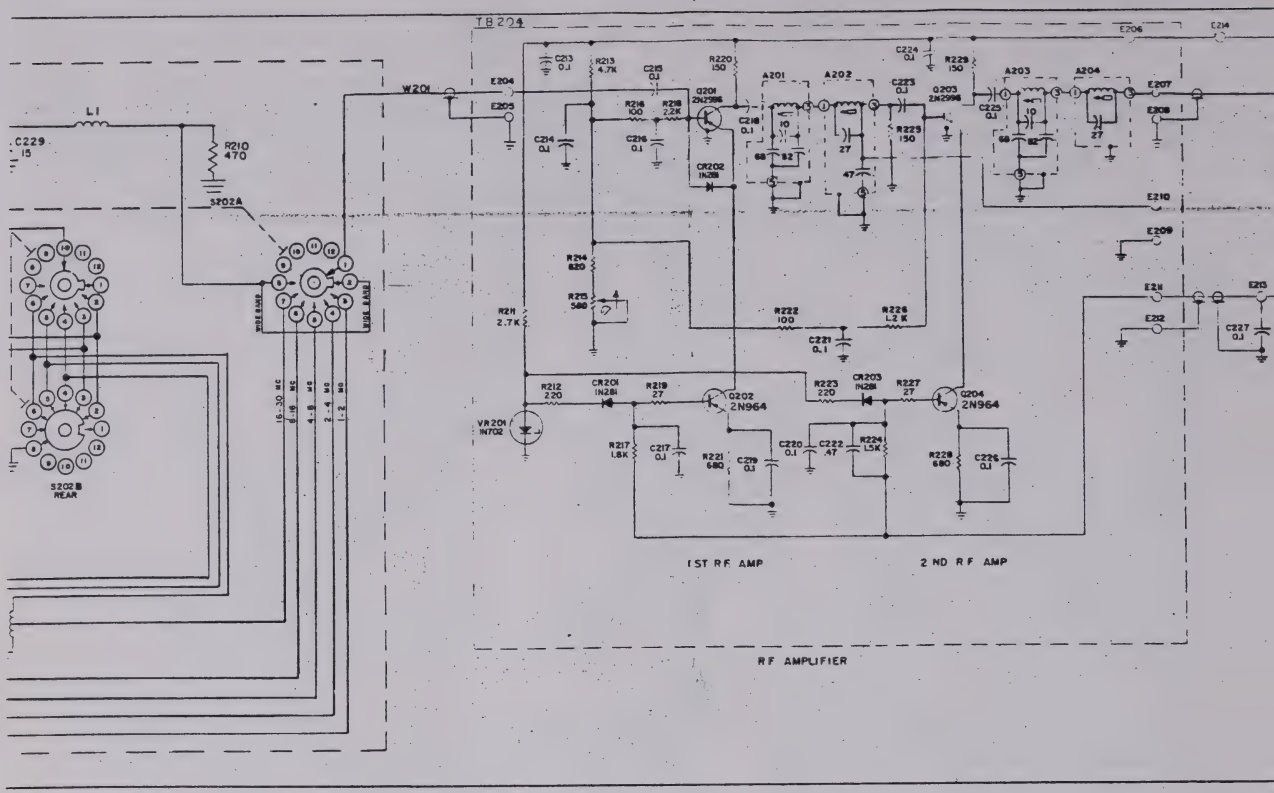


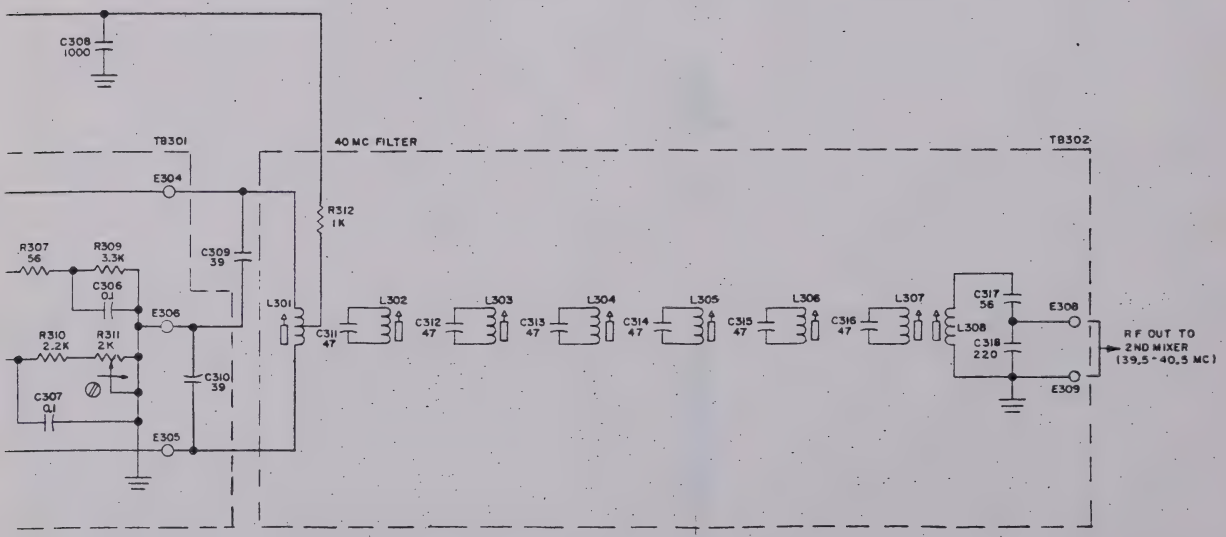
UNLESS OTHERWISE NOTED:

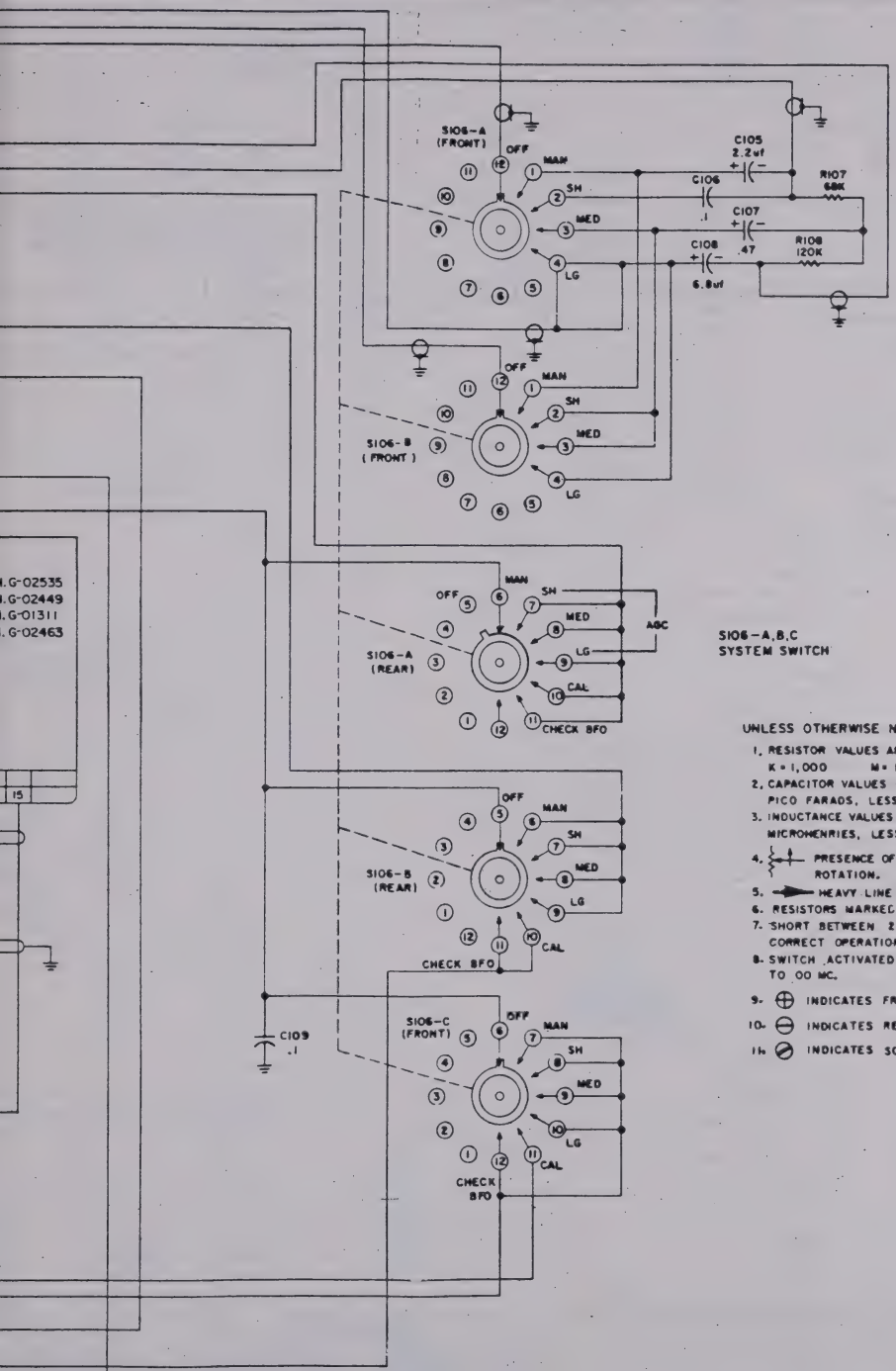
1. RESISTOR VALUES ARE IN OHMS $\frac{1}{4}$ WATT
   K = 1,000 M = 1,000,000
2. CAPACITOR VALUES GREATER THAN ONE ARE IN PICO FARADS, LESS THAN ONE ARE IN MICROFARADS.
3. INDUCTANCE VALUES GREATER THAN ONE ARE IN MICROHENRIES, LESS THAN ONE ARE IN MILLIHENRIES.
4. PRESENCE OF ARROW INDICATES CLOCKWISE ROTATION

INDICATES SCREWDRIVER ADJUSTMENT.

RACAL RA 6217
1 ST. MIXER & 40 MC FILTER
DWG. NO. G 01304
SERIES 300


TB204
W201
E204
E205
E206
E207
E208
E209
E210
E211
E212
E213
E214
L1
C229 15
R210 470
S202A
S202B REAR
C213 0.1
R213 4.7K
C215 0.1
R220 150
Q201 2N2986
R216 100
R218 22K
C214 0.1
C216 0.1
CR202 1N38
A201
A202
C218 0.1
C223 0.1
Q203 2N2998
C224 0.1
R229 150
A203
A204
C225 0.1
R223 150
R214 820
R215 500
R211 2.7K
R222 100
R226 1.2K
C221 0.1
R212 220
CR201 1N281
R219 27
Q202 2N964
CR203 1N281
R227 27
Q204 2N964
VR201 1N702
R217 1.8K
C217 0.1
R221 680
C219 0.1
C220 0.1
C222 47
R224 1.5K
R228 680
C226 0.1
C227 0.1
1ST RF AMP
2ND RF AMP
RF AMPLIFIER


C308 1000
TB301
40 MC FILTER
TB302
E304
R312 1K
R307 56
R309 3.3K
C309 39
C306 0.1
E306
L301
L302
L303
L304
L305
L306
L307
C311 47
C312 47
C313 47
C314 47
C315 47
C316 47
C317 56
L308
C318 220
E308
E309
RF OUT TO 2ND MIXER (39.5-40.5 MC)
R310 2.2K
R311 2K
C310 39
C307 0.1
E305



S106-A,B,C
SYSTEM SWITCH

UNLESS OTHERWISE NOTED:

1. RESISTOR VALUES ARE IN OHMS 1/4 WATT
   K = 1,000 M = 1,000,000
2. CAPACITOR VALUES GREATER THAN ONE ARE IN PICO FARADS, LESS THAN ONE ARE IN MICROFARADS.
3. INDUCTANCE VALUES GREATER THAN ONE ARE IN MICROHENRIES, LESS THAN ONE ARE IN MILLIHENRIES
4. PRESENCE OF ARROW INDICATES CLOCKWISE ROTATION.
5. HEAVY LINE SIGNIFIES SIGNAL PATH
6. RESISTORS MARKED THUS * ARE CHOSEN ON TEST.
7. SHORT BETWEEN 2 & 3 MUST BE IN POSITION FOR CORRECT OPERATION OF RECEIVER.
8. SWITCH ACTIVATED BY MC DRIVE WHEN MC IS TUNED TO 00 MC.
9. ⊕ INDICATES FRONT PANEL LOCATION
10. ⊖ INDICATES REAR PANEL LOCATION
11. ⊘ INDICATES SCREWDRIVER ADJUSTMENT

RACAL
RECEIVER RA 6217A
DWG. NO. G 01310 E
SERIES 100

R.F. ATTENUATOR

ANTENNA 30 MC LPF

ANTENNA TUNED CIRCUITS

RF AMPLIFIER

1ST RF AMP

2ND RF

1ST MIXER

40 MC FILTER

-OUT

OUT
NOTE 7)
LOAD

-16 VDC

S102 (SEE NOTE 8) *

AGC BUS

S103 (SEE NOTE 8)

A112
AUDIO BD
SCH. NO. G-01499
SERIES 1500

E1501 AF IN (1MW AMP)
E1502 AF IN (10MW AMP)
E1503 GRD
E1507 } 1MW OUT
E1508 -16 VDC
E1504 } 10 MW OUT
E1505

J108
PHONES
C103 .001
C104 .001

S104
M101
CR101
R105 3K

ALTERNATIVE POWER SUPPLIES

MA-6300	AC POWER UNIT/BATTERY CHARGER	SCH.G-02535
MA-6301	DC TO DC CONVERTER	SCH.G-02449
MA-6302	AC POWER UNIT	SCH.G-01311
MA-6704	BATTERY PACK	SCH.G-02463

J109: 3 7 1 4 9 2 11 10 12 5 6 8 14 13 15
-16 VDC, -16 VDC UNREG., -16 VDC, EXT GRD, EXT GRD, -16 VDC, 22.5 VAC, GRD, GRD, GRD

TB101
1 -16V UNREG
3 -16V REG
2 -16V SW
4 AGC BUS
5 } 600 OHM 10MW
6
7 } 600 OHM 1MW
8

DS101
DS102
S105 P/O S106
ON
R106 1K DIMMER

S106-A (FRONT)
OFF 12, MAN 1, SH 2, MED 3, LG 4, 5, 6, 7, 8, 9, 10, 11
C105 2.2 MF
C106 .1
C107
C108 .47
6.8 MF
R107 68K
R108 120K

S106-B (FRONT)
OFF 12, MAN 1, SH 2, MED 3, LG 4, 5, 6, 7, 8, 9, 10, 11

S106-A (REAR)
OFF 5, MAN 6, SH 7, MED 8, LG 9, CAL 10, CHECK BFO 12, 11, AGC 1, 2, 3, 4

S106-B (REAR)
OFF 5, MAN 6, SH 7, MED 8, LG 9, CAL 10, CHECK BFO 12, 11, 1, 2, 3, 4

S106-C (FRONT)
OFF 5, MAN 6, SH 7, MED 8, LG 9, CAL 10, CHECK BFO 12, 11, 1, 2, 3, 4

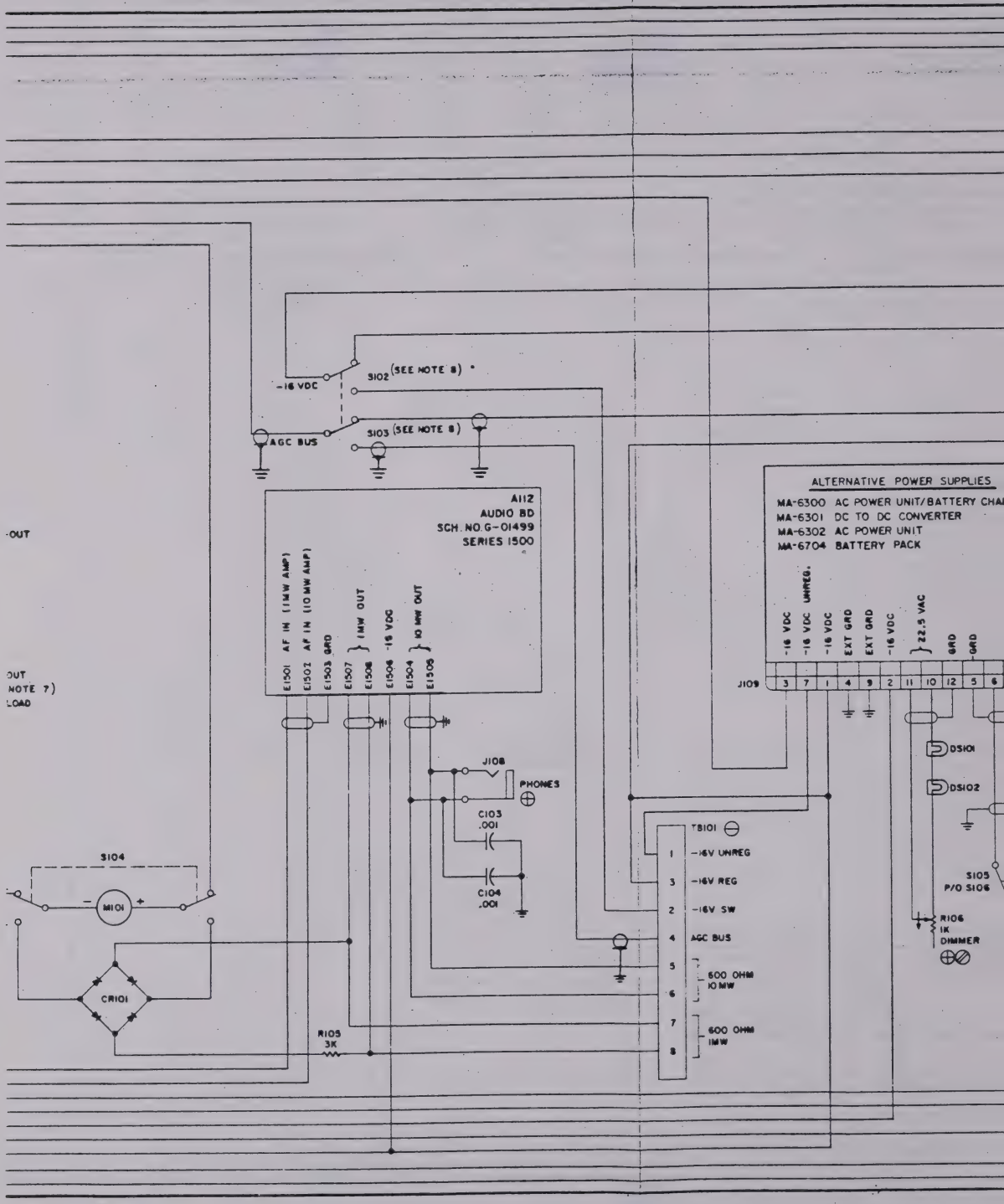
C109 .1

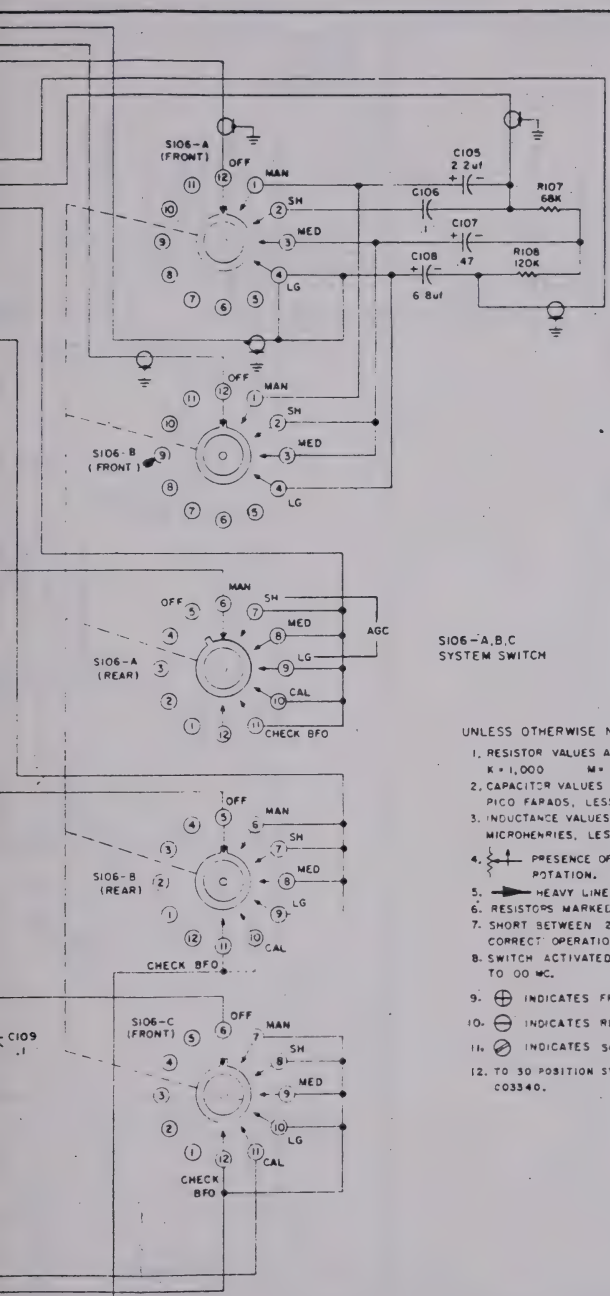
S106-A,B,C
SYSTEM SWITCH

UNLESS OTHERWISE NOTED:

1. RESISTOR VALUES ARE IN OHMS 1/4 WATT
   K = 1,000 M = 1,000,000
2. CAPACITOR VALUES GREATER THAN ONE ARE IN PICO FARADS, LESS THAN ONE ARE IN MICROFARADS,
3. INDUCTANCE VALUES GREATER THAN ONE ARE IN MICROHENRIES, LESS THAN ONE ARE IN MILLIHENRIES
4. ⊣⊢ PRESENCE OF ARROW INDICATES CLOCKWISE ROTATION.
5. ⟶ HEAVY LINE SIGNIFIES SIGNAL PATH
6. RESISTORS MARKED THUS * ARE CHOSEN ON TEST.
7. SHORT BETWEEN 2 & 3 MUST BE IN POSITION FOR CORRECT OPERATION OF RECEIVER.
8. SWITCH ACTIVATED BY MC DRIVE WHEN MC IS TUNED TO 00 MC.
9. ⊕ INDICATES FRONT PANEL LOCATION
10. ⊖ INDICATES REAR PANEL LOCATION
11. ⊘ INDICATES SCREWDRIVER ADJUSTMENT

RACAL
RECEIVER RA 6217A
DWG. NO. G 01310 E
SERIES 100


-16 VDC
S102 (SEE NOTE 8) *
AGC BUS
S103 (SEE NOTE 8)
A112
AUDIO BD
SCH. NO. G-01499
SERIES 1500
E1501 AF IN (1MW AMP)
E1502 AF IN (10 MW AMP)
E1503 GRD
E1507 1MW OUT
E1508
E1504 -16 VDC
E1504 10 MW OUT
E1505
ALTERNATIVE POWER SUPPLIES
MA-6300 AC POWER UNIT/BATTERY CHA
MA-6301 DC TO DC CONVERTER
MA-6302 AC POWER UNIT
MA-6704 BATTERY PACK
-16 VDC
-16 VDC UNREG.
-16 VDC
EXT GRD
EXT GRD
-16 VDC
22.5 VAC
GRD
GRD
J109
3 7 1 4 9 2 11 10 12 5 6
DS101
DS102
J108
PHONES
C103 .001
C104 .001
S104
M101
CR101
R105 3K
TB101
1 -16V UNREG
3 -16V REG
2 -16V SW
4 AGC BUS
5 600 OHM 10 MW
6
7 600 OHM 1MW
8
S105 P/O S106
R106 1K DIMMER
-OUT
OUT
NOTE 7)
LOAD



S106-A,B,C
SYSTEM SWITCH

UNLESS OTHERWISE NOTED:

1. RESISTOR VALUES ARE IN OHMS 1/4 WATT
   K = 1,000 M = 1,000,000
2. CAPACITOR VALUES GREATER THAN ONE ARE IN PICO FARADS, LESS THAN ONE ARE IN MICROFARADS.
3. INDUCTANCE VALUES GREATER THAN ONE ARE IN MICROHENRIES, LESS THAN ONE ARE IN MILLIHENRIES
4. PRESENCE OF ARROW INDICATES CLOCKWISE ROTATION.
5. HEAVY LINE SIGNIFIES SIGNAL PATH
6. RESISTORS MARKED THUS * ARE CHOSEN ON TEST.
7. SHORT BETWEEN 2 & 3 MUST BE IN POSITION FOR CORRECT OPERATION OF RECEIVER.
8. SWITCH ACTIVATED BY MC DRIVE WHEN MC IS TUNED TO 00 MC.
9. ⊕ INDICATES FRONT PANEL LOCATION
10. ⊖ INDICATES REAR PANEL LOCATION
11. ⊘ INDICATES SCREWDRIVER ADJUSTMENT
12. TO 30 POSITION SWITCH SECTION A COMMON REF. C03340.

RACAL
RECEIVER RA 6217E
DWG. NO. G03348 B
SERIES 100

A101
RF UNIT
SCH. NO G-02022
SERIES 200

A102
1st MIXER
& 40 MC FILTER
SCH. NO.G-01304
SERIES 300

A103
2nd MIXER
SCH NO G-01301
SERIES 500

A104
3rd MIXER
SCH NO G-02291
SERIES 900

A3201
1 ST IF AMP
SCH NO G-01505
SERIES 1600

IF & X

A105
1st VFO
SCH NO.G-01308
SERIES 400

A106
37.5 MC
FILTER
SCH.NO.G-01305
SERIES 800

A107
2nd VFO
SCH.NO. G-01309
SERIES 1000

A109
IMC MODULE &
CALIBRATOR
SCH.NO.G-01312
SERIES 600

A108
37.5 MC
GENERATOR
SCH.NO.G-01303
SERIES 700

ANTENNA (REF)

R101 68
R102 68
C101 0.1
C102 0.1
C110 .001
C111 001
C112 0.1
R103 500
CAL. FINE TUNE
R104 680
AT101 75
S101 2nd VFO
INT.
EXT.

FL1 13KC OUT
R1 220

S1-A(FRONT)
S1-A(REAR)
S1-A,C,D,B
IF BW KC
6KC
13KC
3KC
1KC
0.2KC
FL2 OUT 200CPS
FL3 1KC
FL4 3KC
FL5 6KC

S2-C(FRONT)
S2-B(FRONT)
S2-C(REAR)
S2-B(REAR)
S2-C,B,A
DET BFO MODE
R5 10K BFO TUNE KC
R6 15K
R7 6.8K
R8 6.8K
R9 4.7K
R10 4.7K
R11
R12 1K
R13 12K
R14 22K
R15 39K
FM
+15
-15
AM
+6
+3
0
-6
-3

J102 1 MC OUT
J103 1 MC IN
J104 2-3 MC OUT
J105 2-3 MC IN
J106 2ND VFO IN
J107 2ND VFO OUT
J113 1.6 MC WIDE OUT
-16 V SEE NOTE 12

-16 VDC
-16VDC BUS
-16VDC
AGC BUS

-16 VDC

AGC BUS

S102 (SEE NOTE 8)

S103 (SEE NOTE 8)

A112
AUDIO BD
SCH NO G-01499
SERIES 1500

E1501 AF IN (1 MW AMP)
E1502 AF IN (10 MW AMP)
E1503 GRD
E1507 } 1 MW OUT
E1508
E1506 -16 VDC
E1504 } 10 MW OUT
E1505

J108
PHONES
C103 .001
C104 .001

R105 3K

TB101
1 -16V UNREG
3 -16V REG
2 -16V SW
4 AGC BUS
5 } 600 OHM 10 MW
6
7 } 600 OHM 1 MW
8

ALTERNATIVE POWER SUPPLIES

MA-6300	AC POWER UNIT/BATTERY CHARGER	SCH.G-02535
MA-6301	DC TO DC CONVERTER	SCH.G-02449
MA-6302	AC POWER UNIT	SCH.G-01311
MA-6704	BATTERY PACK	SCH.G-02463

J109: -16 VDC, -16 VDC UNREG., -16 VDC, EXT GRD, EXT GRD, -16 VDC, 22.5 VAC, GRD, GRD, GRD

DS101
DS102
S105 P/O S106
ON
R106 1K DIMMER

S106-A (FRONT): OFF, MAN, SM, MED, LG
C105 2.2 uf
C106 1
C107 .47
C108 6.8 uf
R107 68K
R108 120K

S106-B (FRONT): OFF, MAN, SM, MED, LG

S106-A (REAR): OFF, MAN, SM, MED, LG, CAL, CHECK BFO, AGC

S106-B (REAR): OFF, MAN, SM, MED, LG, CAL, CHECK BFO

C109 .1

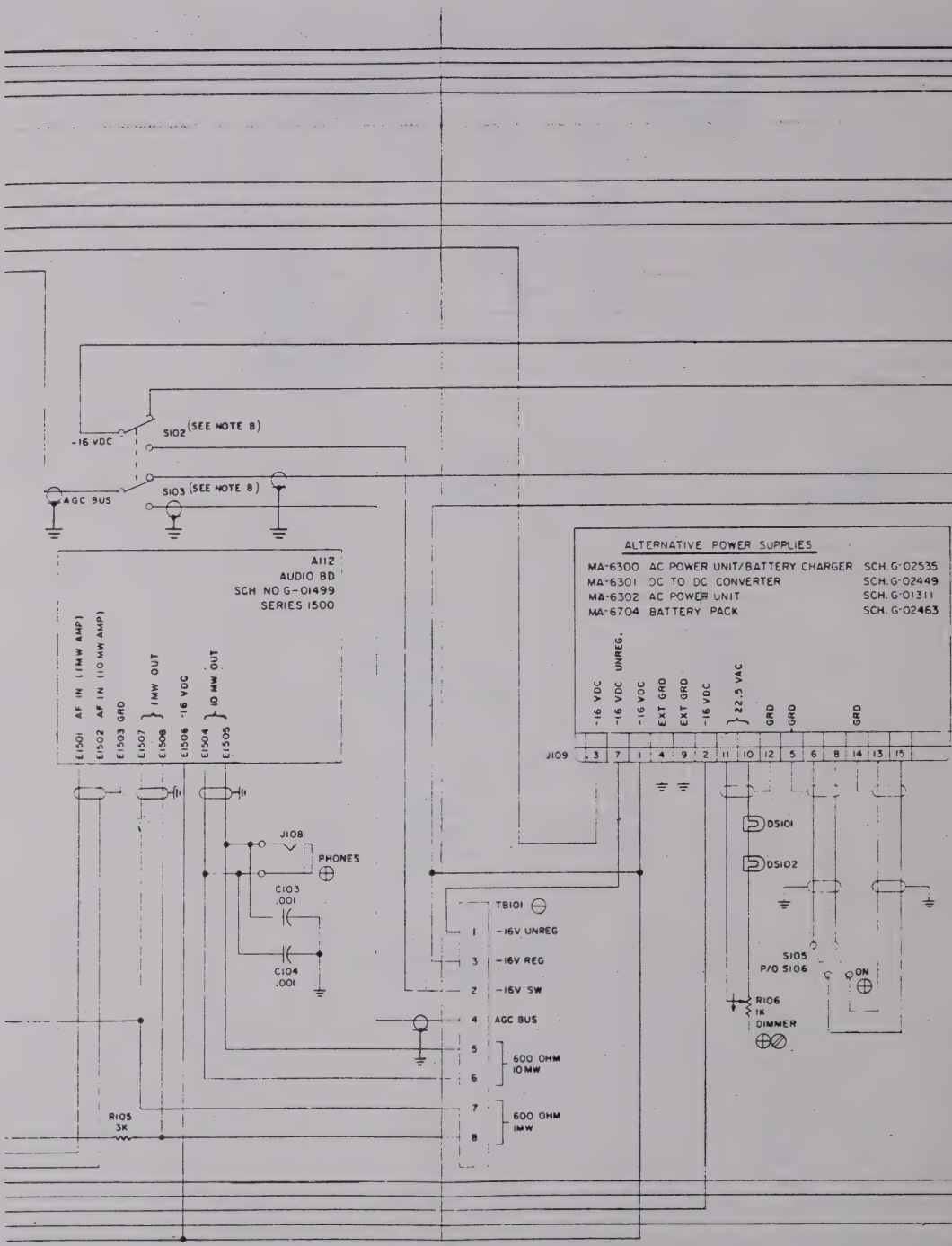
S106-C (FRONT): OFF, MAN, SM, MED, LG, CAL, CHECK BFO

S106-A,B,C
SYSTEM SWITCH

UNLESS OTHERWISE NOTED:

1. RESISTOR VALUES ARE IN OHMS 1/4 WATT
   K = 1,000 M = 1,000,000
2. CAPACITOR VALUES GREATER THAN ONE ARE IN PICO FARADS, LESS THAN ONE ARE IN MICROFARADS.
3. INDUCTANCE VALUES GREATER THAN ONE ARE IN MICROHENRIES, LESS THAN ONE ARE IN MILLIHENRIES
4. PRESENCE OF ARROW INDICATES CLOCKWISE ROTATION.
5. HEAVY LINE SIGNIFIES SIGNAL PATH
6. RESISTORS MARKED THUS * ARE CHOSEN ON TEST.
7. SHORT BETWEEN 2 & 3 MUST BE IN POSITION FOR CORRECT OPERATION OF RECEIVER.
8. SWITCH ACTIVATED BY MC DRIVE WHEN MC IS TUNED TO 00 MC.
9. ⊕ INDICATES FRONT PANEL LOCATION
10. ⊖ INDICATES REAR PANEL LOCATION
11. ⊘ INDICATES SCREWDRIVER ADJUSTMENT
12. TO 30 POSITION SWITCH SECTION A COMMON REF. C03340.

RACAL
RECEIVER RA 6217E
DWG. NO. G 03348 B
SERIES 100


-16 VDC
S102 (SEE NOTE 8)
AGC BUS
S103 (SEE NOTE 8)
A112
AUDIO BD
SCH NO G-01499
SERIES 1500
E1501 AF IN (1 MW AMP)
E1502 AF IN (10 MW AMP)
E1503 GRD
E1507 } 1 MW OUT
E1508
E1506 -16 VDC
E1504 } 10 MW OUT
E1505
ALTERNATIVE POWER SUPPLIES
MA-6300 AC POWER UNIT/BATTERY CHARGER SCH. G-02535
MA-6301 DC TO DC CONVERTER SCH. G-02449
MA-6302 AC POWER UNIT SCH. G-01311
MA-6704 BATTERY PACK SCH. G-02463
-16 VDC
-16 VDC UNREG.
-16 VDC
EXT GRD
EXT GRD
-16 VDC
22.5 VAC
GRD
GRD
GRD
J109
3 7 1 4 9 2 11 10 12 5 6 8 14 13 15
J108
PHONES
C103 .001
C104 .001
TB101
1 -16V UNREG
3 -16V REG
2 -16V SW
4 AGC BUS
5 } 600 OHM 10 MW
6
7 } 600 OHM 1 MW
8
R105 3K
DS101
DS102
S105 P/O S106
ON
R106 1K DIMMER

A110
IF & XTAL FILTER ASSEMBLY
SCH. NO. = THIS DWG
SERIES 3200

S1-A,C,D,B
IF BW KC

S1-C(FRONT)
S1-D(FRONT)
S1-B(FRONT)
S1-C(REAR)
S1-D(REAR)
S1-B(REAR)

FL2 200CPS
FL3 1KC
FL4 3KC
FL5 6KC

R3 100
R4 56
R5 47
W1

S2-B(FRONT)
S2-A (FRONT)
S2-B(REAR)
SR11
R12 11K
R13 12K
R14 22K
R15 39K
R16 39K
R17 8.2K

A3202
EF & METER ZERO
SCH NO G-01758
SERIES 1900
METER ZERO E1904
GND E1902
AF OUT E1901 (EF)
E1903 AF IN
E1909 GND
E1908 -16 VDC
E1905 AF OUT (EF)
E1906 GND
E1907 -16 VDC (DECOUPLED)
R18 1K
R19A 500
IF GAIN
C1 .001
R20 10K
AF LEVEL
R19B 10K
AF GAIN

P2 J3005
J1 P3001

A111
IF PKG
SCH NO G-02028
SERIES 3000

15	AGC (EMITTER OF 2nd DC AMP)
23	AGC BUS
24	GND
2	-16V BUS (TO DET, FM DISC, CONV.)
28	TO AGC AMP
9	AGC TIME CONSTANT
10	GND
31	AGC TIME CONSTANT
32	GND
1	TO IF, AGC -16VDC
14	TO VARICAP IN BFO
4	TO FM DISC
3	TO FM OSC
11	TO 1.6015 MC OSC (-16V SWITCHED)
12	TO 1.5985 MC OSC
5	TO AM DET
13	TO BFO
29	DETECTED PROD AUDIO
30	GND
16	FM VIDEO OUTPUT
17	GND
7	DETECTED AM TO VOLTAGE DIVIDER
8	GND
18	AGC EMITTER OF DC AMP EF Q 1309
19	AGC BASE OF EF Q1408

REF
J2 455KC OUT
J3 1.1454MC IN-OUT
J4 1.6MC OUT
TB1
1 AGC OUT
2 AM DET OUT (SEE NOTE 7)
3 AM DET LOAD

-16 VDC
AGC BUS
S102 (SEE NOTE 8)
S103 (SEE NOTE 8)

A112
AUDIO BD
SCH NO G-01499
SERIES 1500
E1501 AF IN (1 MW AMP)
E1502 AF IN (10 MW AMP)
E1503 GND
E1507 1 MW OUT
E1508 -16 VDC
E1504 10 MW OUT
E1505

J108
PHONES
C103 .001
C104 .001

S104
RF LEVEL
AF LEVEL
M101
CR101
R105 3K

A101
RF UNIT
SCH. NO. G-02022
SERIES 200

A102
1st MIXER
& 40 MC FILTER
SCH. NO. G-01304
SERIES 300

A103
2nd MIXER
SCH. NO. G-01301
SERIES 500

A104
3rd MIXER
SCH. NO. G-02291
SERIES 900

A3201
1 ST IF AMP
SCH. NO. G-01505
SERIES 1600

IF & XT
SC

ANTENNA (REF)

R101 68
R102 68
C101 0.1
C102 0.1
C110 .001
C111 .001

P501 J101
RF IN (39.5-40.5 MC)
-16 VDC
37.5 MC IN
2-3 MC IN/OUT
-16 VDC
RF OUT (2-3 MC)

P901 J110
RF IN (2-3 MC)
-16 VDC
3.6 - 4.6 MC IN
CAL IN (100 KC)
IF OUT (1.6 MC)
GRD
1.6 MC WIDE OUT

FL1 13KC OUT
P1 J1601
IF IN (1.6 MC)
-16 VDC
IF OUT
R1 220

S1-A (FRONT)
6KC
13KC
3KC
1KC
0.2KC
S1-A (REAR)
S1-A, C, D, B
IF BW KC
FL2 200CPS OUT
FL3 1KC OUT
FL4 3KC OUT
FL5 6KC OUT

A105
1st VFO
SCH. NO. G-01308
SERIES 400

E412 41.5 - 69.5 MC OUT
E413 GRD
E410 41.5 - 69.5 MC OUT
E411 GRD
E409 -16 VDC
P402 J111
P401 J112

A106
37.5 MC
FILTER
SCH. NO. G-01305
SERIES 800

E801 37.5 MC IN
E802 GRD
E803 37.5 MC OUT
E804 GRD

A107
2nd VFO
SCH. NO. G-01309
SERIES 1000

J1001 P102
EXT. VFO IN
3.6 - 4.6 MC OUT
VFO INT - EXT. ELECTRONIC SWITCH
CAL., FINE TUNE
-16 VDC
3.6 - 4.6 MC OUT

R103 500
CAL - FINE TUNE
C112 0.1
INT.
EXT.
S101 2nd VFO

A109
IMC MODULE & CALIBRATOR
SCH. NO. G-01312
SERIES 600

A108
37.5 MC GENERATOR
SCH. NO. G-01303
SERIES 700

J601 P101
41.5 - 69.5 MC IN
-16 VDC
1 MC OUT
1 MC IN
100 KC OUT
-16 VDC
-16 VDC
37.5 MC OUT

R104 680
AT101 75

J102 1 MC OUT
J103 1 MC IN
J104 2-3 MC OUT
J105 2-3 MC IN
J106 2ND VFO IN
J107 2ND VFO OUT
J113 1.6 MC WIDE OUT

-16 V SEE NOTE 12

S2-C (FRONT)
S2-B (FRONT)
R5 10K BFO TUNE KC
R6 15K
R7 6.8K
R8 6.8K
R9 4.7K
R10 4.7K
R11
R12 1K
R13 2K
R14 22K
R15 39K

S2-C, B, A
DET BFO MODE
FM
+1.5
-1.5
AM
+6
+3
0
-3
-6

S2-C (REAR)
S2-B (REAR)

-16 VDC
-16 VDC BUS
-16 VDC
AGC BUS

A110
IF & XTAL FILTER ASSEMBLY
SCH NO = THIS DWG
SERIES 3200

S1-A,C,D,B
IF BW KC

S1-C(FRONT)
S1-D(FRONT)
S1-B(FRONT)
S1-C(REAR)
S1-D(REAR)
S1-B(REAR)

FL2 200CPS
FL3 1KC
FL4 3KC
FL5 6KC

R2 47
R3 100
R4 56

W1

S2-A (FRONT)
S2-B(FRONT)
S2-B(REAR)

R11
R12 1K
R13 12K
R14 22K
R15 39K
R16 39K
R17 8.2K

P2 J3005
J1 P3001

15	AGC(EMITTER OF 2nd DC AMP)
23	AGC BUS
24	GRD
2	-16V BUS (TO DET, FM DISC, CONV.)
28	TO AGC AMP
9	AGC TIME CONSTANT
10	GND
31	AGC TIME CONSTANT
32	GND
1	TO IF, AGC -16VDC
14	TO VARICAP IN BFO
4	TO FM DISC
3	TO FM OSC
11	TO 1.6015 MC OSC
12	TO 1.5985 MC OSC
5	TO AM DET
13	TO BFO
29	DETECTED PROD AUDIO
30	GND
16	FM VIDEO OUTPUT
17	GND
7	DETECTED AM TO VOLTAGE DIVIDER
8	GND
18	AGC EMITTER OF DC AMP EF Q1309
19	AGC BASE OF EF Q1406

-16V SWITCHED

A111
IF PKG
SCH NO G-02028
SERIES 3000

REF
J2 455KC OUT
J3 1.145MC IN-OUT
J4 1.6MC OUT

TB1
1 AGC OUT
2 AM DET OUT (SEE NOTE 7)
3 AM DET LOAD

A3202
EF & METER ZERO
SCH NO G-01758
SERIES 1900
METER ZERO E1904
GND E1902
AF OUT E1901 (EF)

E1903 AF IN
E1909 GRD
E1908 -16 VDC
E1905 AF OUT (EF)
E1906 GRD
E1907 -16 VDC (DECOUPLED)

R18
R19A 500
IF GAIN
C1 .001
R20 10K
AF LEVEL
R19B 10K
AF GAIN

-16 VDC
S102 (SEE NOTE 8)
AGC BUS
S103 (SEE NOTE 8)

A112
AUDIO BD
SCH NO G-01499
SERIES 1500

E1501 AF IN (1MW AMP)
E1502 AF IN (10 MW AMP)
E1503 GRD
E1507 1MW OUT
E1508
E1506 -16 VDC
E1504 10 MW OUT
E1505

J108
PHONES
C103 .001
C104 .001

S104
RF LEVEL
AF LEVEL
M101
CR101
R105 3K